AN HBJ PUBLICATION

JUNE 1986/$2.50

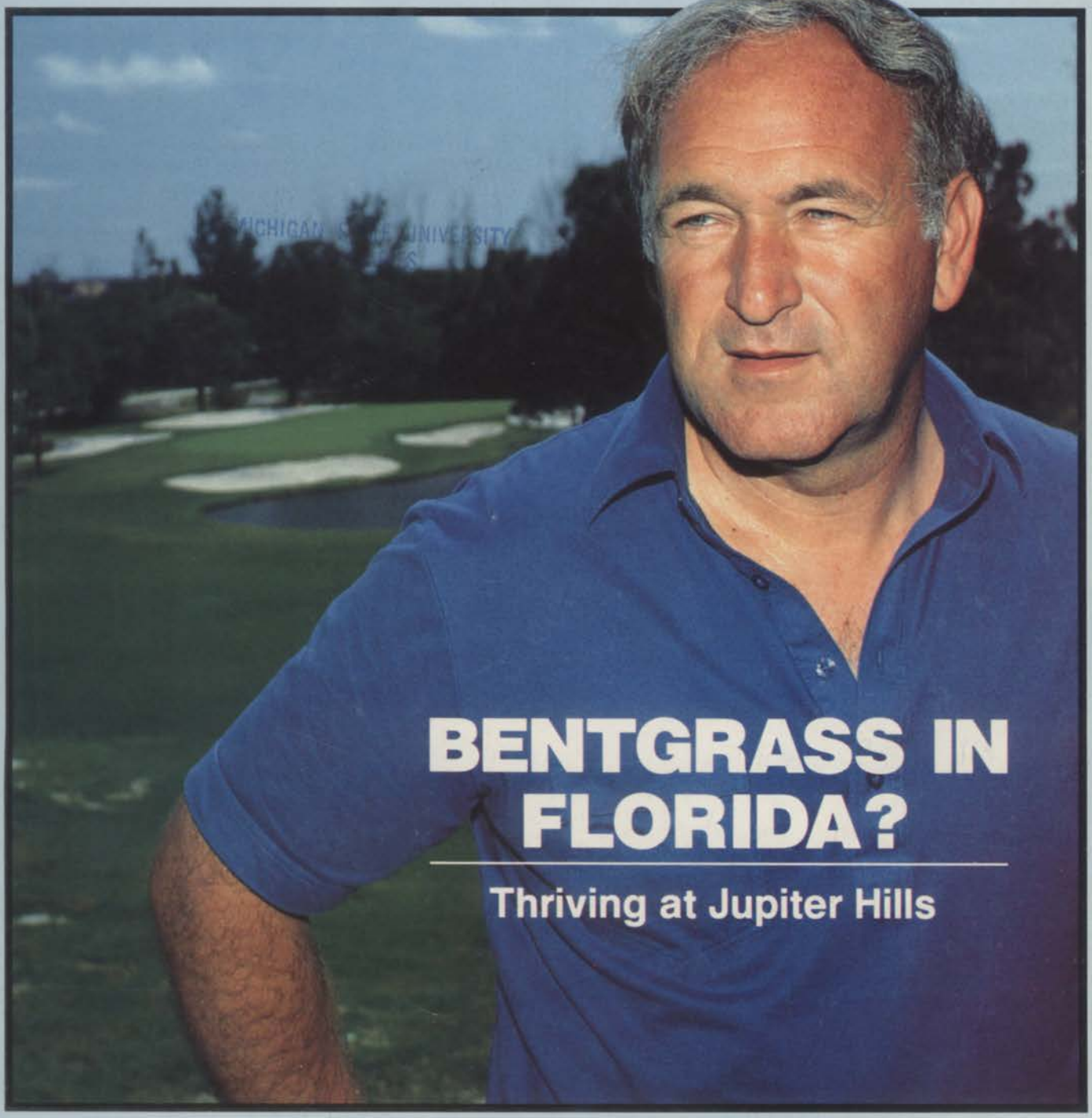
WEEDS TREES & TURF

The Magazine of Landscape and Golf Course Management Since 1962

De-weeding rights-of-way

The future of growth regulators

More on summer patch



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JUNE 1986, VOLUME 25, NUMBER 6

WEEDS TREES & TURF

The Magazine of Landscape and Golf Course Management Since 1962

36

49

54

22 COVER STORY: ONE OF A KIND
Unlike its south Florida neighbors, Jupiter Hills Golf Club has the turf and trees of a northern course.

26 MILES TO GO . . .
Rights-of-way landscape managers do things on a big-big scale, according to a recent survey by WEEDS TREES & TURF.

30 UNDER CONSTRUCTION
Growth in the booming Valley of the Sun presents a challenge to the Arizona Dept. of Transportation's Highway Division.

36 WEED ERADICATION
In sunny San Bernardino, Calif., bare gound next to the roadside is the aim of county agricultural workers.

40 PGRs FOR HIGHWAY TURF
Rights-of-way landscape managers are finding it convenient and less expensive to use "chemical mowing" techniques.

49 WEED FREE
For scenic roadsides, a sound fertilizer program means deeply-rooted plants that can battle weeds for water and nutrients.

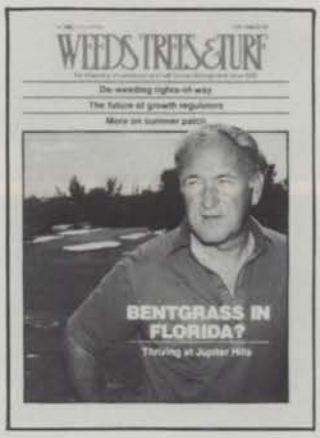
54 TOUGH MARKETPLACE
The nation's landscape fabric manufacturers are so convincing in their claims that a customer really doesn't know who to believe.

68 PATCH DISEASES
Third of three parts on controlling patch diseases of turf, by Dr. Houston Couch of VPI-SU.

74 LEASING VS. BUYING
There is no easy way to figure out whether it's cheaper to buy or lease. Rudd McGary and Ed Wandtke discuss alternatives.

DEPARTMENTS

6 NEWS/TRENDS
8 GREEN INDUSTRY NEWS
14 SHORT CUTS
76 PROBLEM SOLVERS
77 PRODUCTS
80 LETTERS
86 CLASSIFIED
90 AD INDEX
92 OUTLOOK



Dick Herr of Jupiter Hills, photo by Ron Hall.

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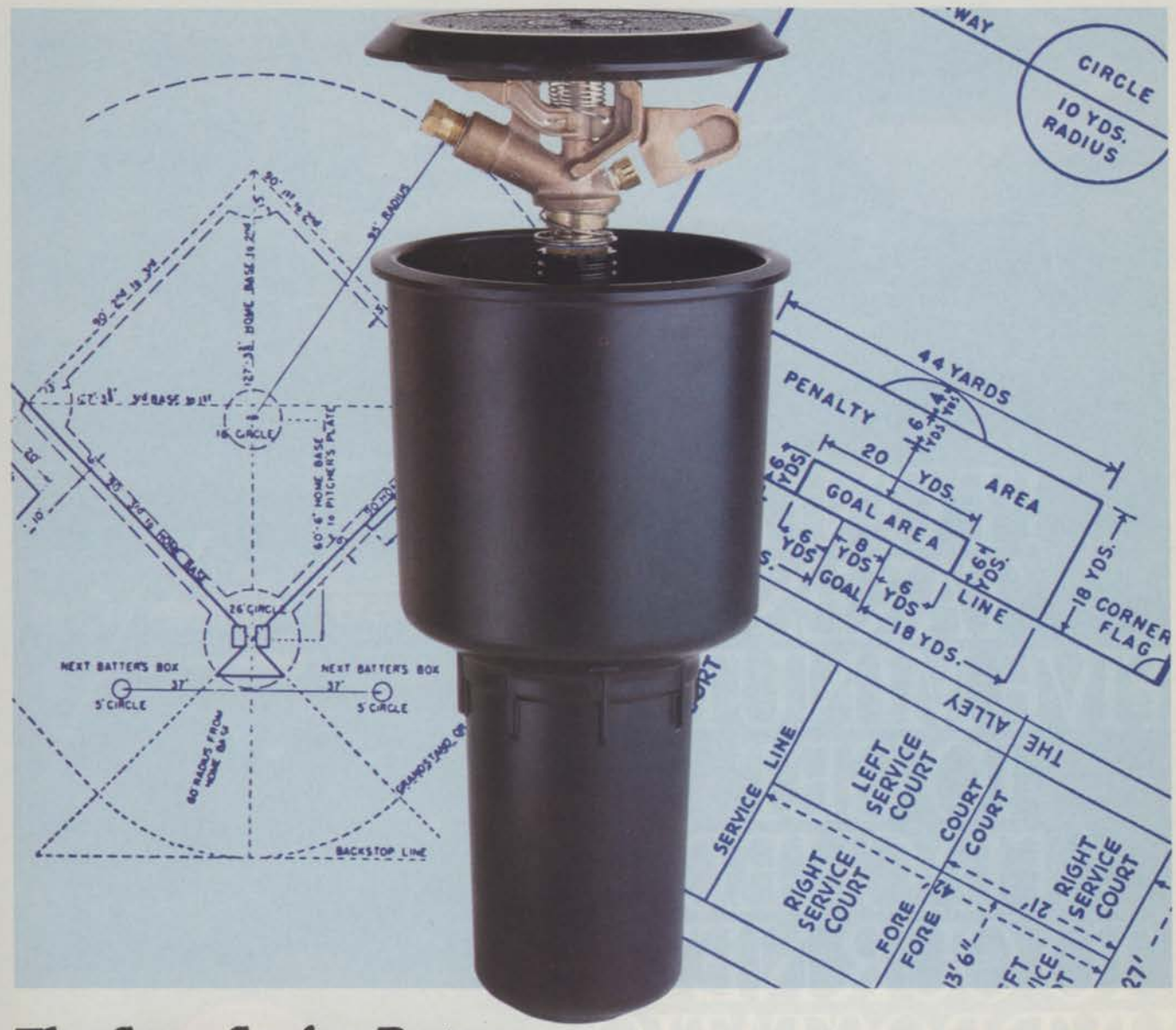

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NEWS/TRENDS by the Editorial Staff

Jerry Roche

Ken Kuhajda

Heide Aungst

Hi-tech hits outdoor power

■ A recent trend toward using technology to create smaller, more efficient outdoor power equipment will continue into the 1990s, according to a small engine expert.

"Outdoor power equipment is using science and technology today, not mass, not force, not brute strength," says John Johnston, national service manager for HMC/the Green Machine, Long Beach, Calif. "Five years from now, you'll be working on plastic and ceramic engines weighing two to three pounds and producing temperatures up to 1200 degrees Fahrenheit."

John Johnston

Johnston, who gave a series of "total service seminars" to HMC dealers across the nation last winter, points also to advances being made on engines of all sizes. "There will come the day when you'll see no spark plugs in engines," he notes. "As early as next year, General Motors products won't have distributors."

Toro enters fitness market

■ The Toro Company is not sitting still, enjoying its comeback from a well-publicized slump of a few years ago. A leading independent manufacturer of lawn care equipment, Toro has entered a market outside its usual domain—the fitness market.

The Minneapolis-based company has introduced the Isopower exercise machine, a technologically-advanced product that made its debut in February. The machine uses electronics, rather than actual weights, to control resistance.

Bob Carlson, Toro fitness equipment vice-president and an exerciser himself, explains: "The major difference between this equipment and others is that it uses electromagnetic force to create resistance as opposed to mechanical means."

Two birds with one system

■ Texas researchers have designed and developed an irrigation system capable of applying both water and chemicals through separate nozzle systems from the same moving pipe. W.M. Lyle of the Texas Agricultural Experiment Station and J.P. Bordovsky developed the dual-nozzle system for efficient irrigation and accurate chemical application.

The researchers say the say the new Multi-Function Irrigation System (MFIS) is an upgraded Low Energy Precision Application (LEPA) system. LEPA consistently posted application efficiencies of 98 to 99 percent.

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MAINTENANCE

Should students work on campus grounds?

Landscape managers at Midwestern colleges have differing opinions on allowing students to work on campus grounds.

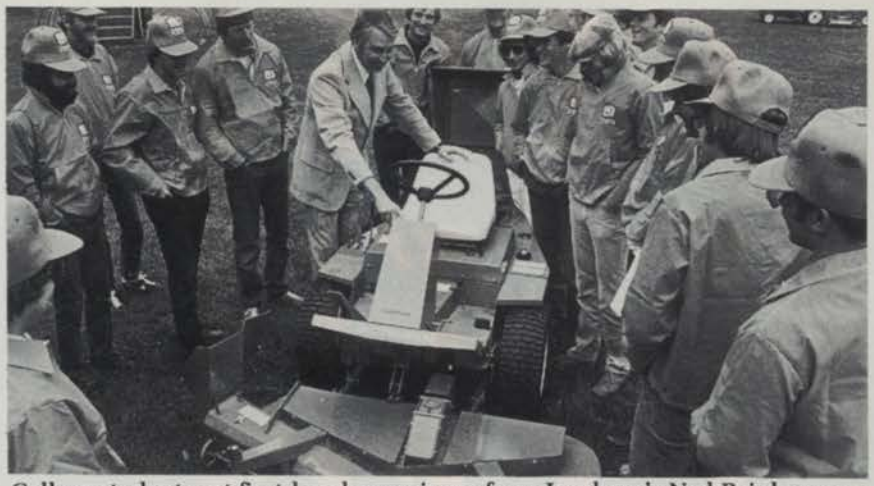
Managers discussed the problem at the third annual campus management seminar sponsored by the National Institute on Parks and Grounds Management, held in Indianapolis.

Some landscape departments have little choice but to accept financial aid students under work/study programs. Gordon Wills, supervisor at Marion College in Marion, Ind., says student help can be useful when the right students are hired for the crew.

Wills says the key to success is the interview. "I try to find out as much about the student as I can," Wills says.

Wills also says its important to hire students with better than average grades. The above-average student will adjust easier to college and will be able to handle the added responsibility of a job.

Once the student is hired, it's important to check the work. Many students are anxious to finish quickly, whether to get on to other activities or to try to impress the supervisor. Or, some students try to stretch out the work, since they're paid an hourly wage.



College students get first-hand experience from Jacobsen's Ned Brinkman on using turf maintenance equipment at an annual seminar.

Either way, its important for supervisors to keep expectations reasonable and check students work frequently.

Wages will vary depending on the college or university. Morris Burkett, program coordinator at Wabash Valley College in Mount Carmel, Ill., pays his students minimum wage. Mount Carmel has a high unemployment rate. "People are glad to work, if they can find a way," Burkett says.

At the University of Illinois, Chicago branch campus, students on the grounds crew start at $7.50 an hour, according to operations engineer Larry Thompson.

Insurance coverage for students will also differ at each campus. Some campuses cover students for all areas of grounds work, including equipment operation. Others have limited use of student help. Summer help may also fall under different coverage than work/study students.

Before using students on the grounds crew, you may want to check with your college administration for any regulations concerning student help.

BUSINESS

Charting inflation's impact

Have your sales kept up with inflation?

U.S. Chamber of Commerce economist Martin Lefkowitz has developed a formula for calculating changes in the dollar's purchasing power.

The formula tells the amount of money needed today to match the dollar's buying power during any of the past 25 years. It's determined by using the inflation factor geared to the consumer price index (CPI).

The chart here gives corresponding figures.

For example, it would take $3.78 this year to match the dollar's power in 1960, and $2.68 to equal the 1970 dollar.

To get larger figures, just multiply. If you were making $30,000 a year in 1970, you need to make $86,400 this year to have the same purchasing power (2.88 x $30,000). If your sales in 1965 totaled $300,000, you would have to be doing well over $1 million to keep up with inflation. (3.55 x $300,000).

Lefkowitz says the index is helpful in enabling business people to bring any dollar amount up to the current year in real terms.

25-YEAR INFLATION MULTIPLIERS

1960 - 3.78	1969 - 3.05	1978 - 1.71
1961 - 2.74	1970 - 2.88	1979 - 1.54
1962 - 3.70	1971 - 2.76	1980 - 1.36
1963 - 3.65	1972 - 2.67	1981 - 1.23
1964 - 3.61	1973 - 2.52	1982 - 1.16
1965 - 3.55	1974 - 2.27	1983 - 1.12
1966 - 3.45	1975 - 2.08	1984 - 1.08
1967 - 3/35	1976 - 1.97	1985 - 1.04
1968 - 3.22	1977 - 1.85	1986 - 1.00

INDUSTRY

MMSD to stick with Milorganite

On the heels of rumors at last winter's GCSAA Convention and Show that it would abandon production of Milorganite fertilizer, the Milwaukee Metropolitan Sewerage District has issued a press release.

"Lay that rumor to rest," says MMSD executive director Patrick Marchese. "We are committed to stepped-up Milorganite production."

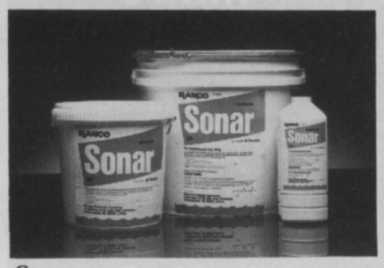
The MMSD says it will increase production 25 percent to 75,000 tons when a major modernization and expansion at the Jones Island Wastewater Treatment Plant is completed.

"Never has the Milorganite future looked so bright," says Mike Malk, solids utilization manager. "We wouldn't throw big bucks at Milorganite if it weren't a leader in its field."

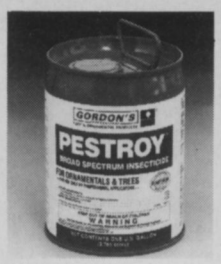
The MMSD is the only sewerage agency in the country to nationally market a heat-dried, granular fertilizer derived from sewage sludge.

Roundup L&G

Escort



Sonar



Pestroy

Penncozeb

REGISTRATIONS

Numerous pesticides receive new labels

Roundup L&G, Pennant 5G, Escort, Sonar, Pestroy and Penncozeb have all been granted labels by the EPA.

Roundup L&G herbicide, by Monsanto, is formulated and packaged for residential use on perennial and annual weeds, grasses and brush species. Roundup L&G is an 18 percent concentrate of the active ingredient glyphosate. The herbicide will kill most vegetation, but has no activity in the soil, so it can't move through the ground to hit plant materials.

Ciba-Geigy has received EPA registration on its granular herbicide Pennant 5G. The herbicide fights weeds and grasses, especially nutsedge, in container, field and liner grown ornamentals.

Pennant 5G is marketed for nursery and ornamentals operators, but should not be used in greenhouses. It is not labeled for use in California.

DuPont's herbicide, Escort, has received full EPA registration.

Escort provides selective broadleaf weed control, as well as seedhead and growth suppression of perennial grasses. It is also labeled for bareground and brush control programs.

Many desirable plants, including bermudagrass, bluegrass and fescue are resistant to the product. It will kill plants such as clover, common chickweed and dandelions.

The EPA has registered Elanco's new aquatic herbicide Sonar. Sonar removes pondweed, coontail, waterlily, duckweed and other aquatic weeds.

It doesn't carry label restrictions against fishing, swimming or drinking treated water. Sonar also has no detrimental effects on fish, game birds, insects or organisms such as plankton.

PBI-Gordon has introduced Pestroy Broad Spectrum Insecticide. Pestroy is labeled for control of various insect and mite pests which attack ornamental shrubs and trees.

The insecticide contains the active ingredient fenitrothion. Pestroy won't harm most trees and shrubs, but will kill a wide range of pests including caterpillars, cankerworms, leafbeetles and whiteflies.

The EPA has registered Pennwalt Corporation's Penncozeb (mancozeb) fungicide. Penncozeb controls many plant diseases in field, fruit and vegetable crops.

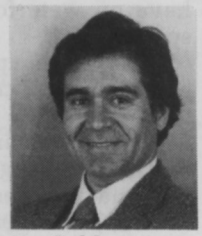
Penncozeb is a wettable powder which can be applied by ground or aerial equipment. It controls fusarium blight, anthracnose and downy mildew, among other diseases.

LAWN CARE

PLCAA chooses conference speaker

Business achievers are made, not born. That's what Charles Garfield, keynote speaker for the seventh annual Professional Lawn Care Association Conference and Show, found during years of studying business.

Garfield will provide the keynote address at the conference, which will be held in Baltimore Nov. 17-20.



Garfield

Garfield's work has appeared in The Wall Street Journal, USA Today and on all three major television networks. He is author of the book "Peak Performers: the New Heroes of American Business."

For more information, call or write the PLCAA at: 1225 Johnson Ferry Rd., Suite B-220, Marietta, GA, 30067; (404) 977-5222.

LEGISLATION

FIFRA agreement may be near

Agricultural pesticide producers seem close to agreeing with various organizations on a draft bill reauthorizing the Federal Insecticide, Fungicide and Rodenticide Act.

As WEEDS TREES & TURF went to press, the National Agricultural Chemicals Association (NACA) and the Coalition for Pesticide Reform (CPR) had agreed on all but one section (groundwater) with 42 environmental, consumer and labor organizations.

The agreed-upon provisions will push the EPA toward faster re-registration or cancellation of questionable pesticides. The bill also requires U.S. exporters of pesticides banned in their country to warn other countries of dangers, and forbids U.S. imports of food with detectable residues of banned pesticides.

The agrichemical industry is cooperating on FIFRA because of an understanding that public interest groups won't block the bill.

Correction: Lesco products are listed

Eleven herbicides manufactured by Lesco Inc., Rocky River, Ohio, were inadvertently omitted from the Herbicide Directory in the March issue of WEEDS TREES & TURF.

According to Greg Richards, Lesco chemical product manager, here are the omissions/corrections:

Lesco Benefin (benefin), Lescocide Plus (copper), Lesco Dacthal 5G (DCPA), Lescopex and Super Lescopex (MCPP), Lesco 6.6 MSMA (MSMA), Lesco Devrinol 5G (napropamide) Lesco Pre-M (pendimethalin), Lesco A-4D (2,4-D), Lesco Three-Way (2,4-D + MCPP + dicamba), Lescopar (MCPP + 2,4-D) and Lescobor (ureabor).

WT&T regrets any inconvenience caused by these omissions.

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SURVEY

Survey reveals commercial increase

Landscape maintenance companies are seeking more commercial accounts because of the increased profit.

Ninety-two percent of landscape maintenance workers surveyed by LAWN CARE INDUSTRY magazine say they seek out commercial work for the money, while 65 percent see more potential in the field.

Only 57 percent of chemical lawn care companies look for commercial accounts based on money, while 79 percent say they recognize the potential.

Landscape maintenance companies got 78 percent of their gross receipts from commercial work. Chemical lawn care respondents cited only 34 percent of their gross receipts from commercial jobs.

The commercial work field is expanding. Landscape maintenance companies saw their commercial work increase by 54 percent, while residential work went up only 10 percent last year.

The average acreage of a commercial account is six acres for landscape maintenance companies and 6½ acres for chemical lawn care companies.

LCI surveyed 500 readers on commercial work, with a 28 percent response. Of those responding, 57 percent worked in landscape maintenance, while 43 percent had chemical lawn care companies.

INSECTICIDES

Cornell prof gives tips on diazinon use

Dr. Norman Hummel, extension turf specialist at Cornell University, says there are several actions you can take to reduce the potential hazardous effect the insecticide diazinon may have on waterfowl and other bird species.

(The EPA has proposed banning diazinon on golf course and sod farm turf because the chemical may present hazards to birds. The EPA is currently reviewing scientific data and will make a decision shortly. See WT&T, March 1986, p.8)

Hummel recommends:

1) know the label and follow it carefully;

2) control the application rate;

3) don't overlap spray;

4) water-in immediately after application (for liquid and granular, at least ¼-inch is recommended);

5) before puddles forms (they attract bird);

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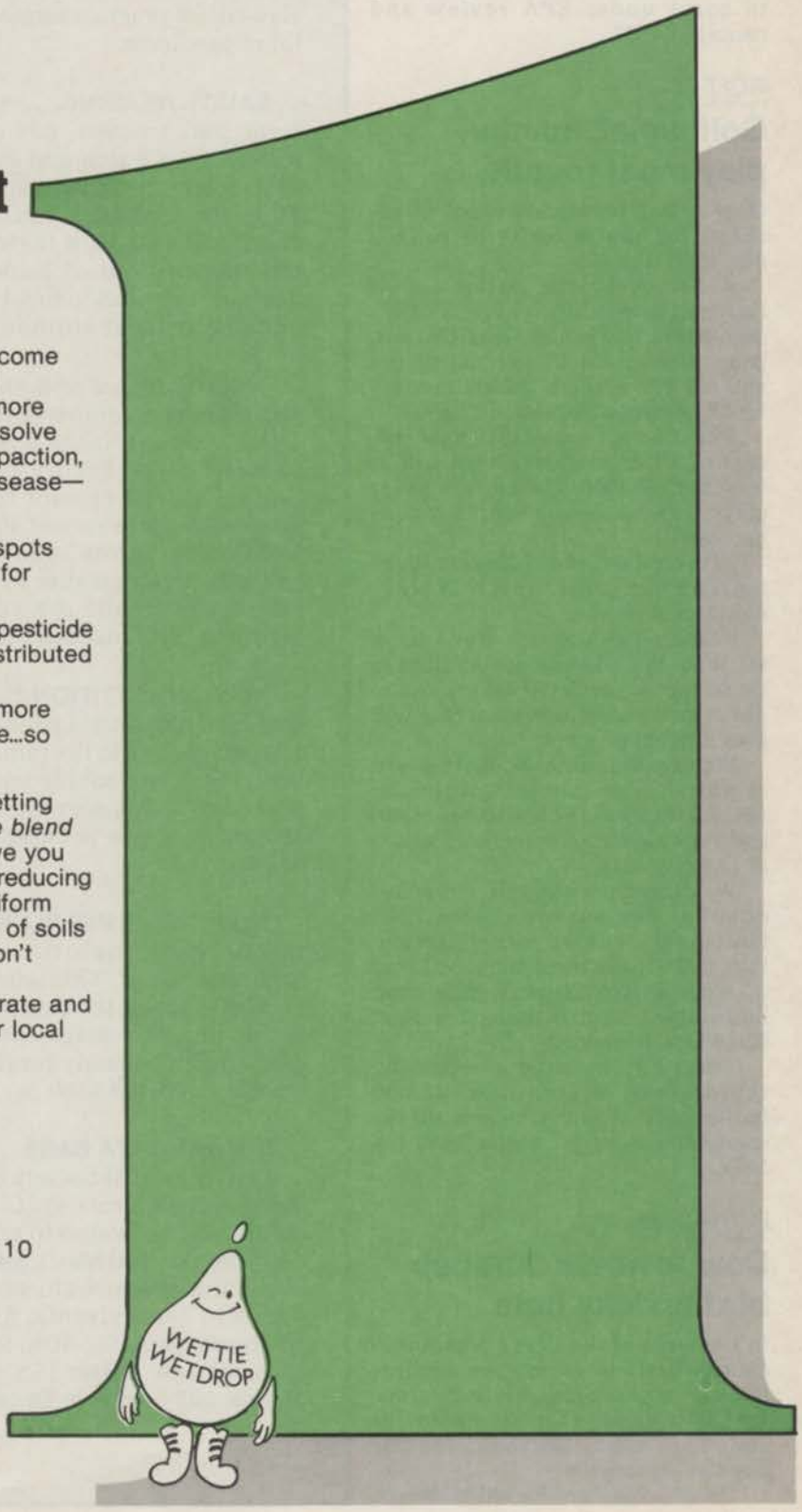

6) avoid treating bird habitat areas; and

7) try using "scarecrow" techniques.

Hummel, who still recommends diazinon, nevertheless sees a scary trend in the offing. "What we've got here is a dangerous precendent," he says of the diazinon review. "Everytime a pesticide is misused, is it going to come under EPA review and cancellation?"

GOLF

Golf: small number play most rounds

Only a small percentage of golfers account for the majority of rounds played in America.

A survey by the National Golf Foundation and Market Facts, a Chicago-based marketing research company, states that 25 percent of the nation's 17.5 million golfers account for 77 percent of all rounds played.

The research shows that eight percent of all Americans played golf at least once in 1985. The average golfer plays between eight and 24 rounds per year.

"This is the first definitive study of the American golfer," says NGF president David Hueber.

"The results so far have been startling. We will use our findings to shape our promotional efforts and to direct our resources in areas that will give us greatest yield."

Men are four times as likely to golf as women. The sport is most popular with 30- to 39-year-olds (10.4 percent) and ranks lowest among those under 20 (3.9 percent).

Wealthier people golf more frequently. The survey showed that households with an income greater than $40,000 are three times as likely (13.4 percent) to contain a golfer than households with income less than $20,000 (4.4 percent).

The study featured a nationally representative sample of 20,000 households. It is the largest survey conducted strictly for golf, says the NGF.

PESTICIDES

Dow reviews Dursban bird toxicity data

In the wake of the EPA's proposal to cancel diazinon insecticide applications on golf courses and sod farms, the Dow Chemical Co. has issued this statement about Dursban, another popular insecticide:

"Dursban poses no hazard to birds or

SHORT CUTS

AND THE BAND PLAYED ON..... Chuck Raetzman, head landscaper at the University of Arizona in Tucson, has studied his fields with great interest the past 18 years. The bermudagrass football field on the south Arizona campus is usually in fine shape when the season rolls around and stays that way until the bands take over. No matter what any band director tells you, band practices *do* damage athletic fields, he says. Have them practice somewhere else. He says it will spare you a lot of problems.

SAUCY READING..... Anne M. Burford, EPA administrator from 1981 to 1983, has a new book out. "Are You Tough Enough?" is a rich and sassy account of her 22 months at the EPA. She comes down especially hard on EPA regional officials, who, she claims, "would be happy to de-industrialize the United States" with their desire for regulations so strict as to put industry out of business. Burford was the first modern cabinet-level U.S. official to be held in contempt of Congress, and that cavalier attitude shows up in her book.

FAKING IT..... For botanical identification, they call it *Disneyodendron semperflorens grandis*, which, roughly translated, means "large ever-blooming Disney tree." It's the concrete Swiss Family Robinson Tree at Disneyland in Anaheim, Calif. Its cement roots plunge 42 feet into the ground, giant steel limbs spread 80 feet wide, and 360,000 plastic leaves and flowers "grow" on the upper branches. Rumor has it the tree was designed after a Nairobi ficus. The only problem is the ficus tree's striatia run vertical, but they're horizontal on the fake tree. You just can't fool Mother Nature.

NEW COMPETITION..... Lawn care operators have new competition from an old friend. The Andersons, Maumee, Ohio, is now marketing to the public a product line called Greensweep, liquid fertilizer sold in one-quart sprayable bottles designed to make fertilizing easy for the homeowner. The Andersons says the product line is designed for the "non-serious do-it-yourselfer."

TAKING THE BIG PLUNGE..... Monsanto Agricultural Products Co. is looking to the residential market with its turf growth regulator, Limit. This winter Monsanto held some 80 end-user seminars across the country. They have advertised Limit heavily in industry magazines. The St. Louis-based company is planning to be ready for the residential market by 1988, and is quoting a cost of $300 per acre per application.

ISA HAS DATA BASE..... To better serve the green industry, the International Society of Arboriculture (ISA) has formed an Arbor Base Information Clearing House for direct access to new information of value to arborists. The Clearing House became fully operational May 1, and is accessible by phoning 1-800-ISA-TREE from 8 a.m. until 4:30 p.m. EDT, Monday through Friday. Those in Pennsylvania, Alaska, Hawaii, and Canada will have to phone 1-215-322-4040 for more immediate access. For more information write: ISA, Arbor Base Information Clearing House, 207 Lakeside Dr., Southampton, PA 18966-4527.

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WHY ARSENAL IS EASY ON THE ENVIRONMENT.

Because of its unique mode of action, ARSENAL, when used as directed, has no harmful effects on mammals, fish, bees, birds or earthworms. Because ARSENAL is non-volatile and doesn't move laterally in the soil, off-target vegetation is unaffected. ARSENAL is nonflammable. Its unique chemical activity causes a slow "brown-out" in foliage, so it poses little fire hazard. Unlike tank mixes, ARSENAL introduces only one biodegradable product into the environment. And it's applied only once during a season, resulting in a lower chemical burden and a reduction in "touch-up" treatments.

CONTROLS MORE UNDESIRABLE VEGETATION.

ARSENAL has demonstrated control of a broad spectrum of weeds, vines and brush species. Tests in southern states showed that ARSENAL alone (at a rate of two quarts per acre) out-performed several tank mixes for annual and perennial weed control. Even more impressive, ARSENAL was most effective on difficult species like Johnsongrass, trumpetcreeper, kudzu and red maple.

ONE APPLICATION GIVES SEASON-LONG CONTROL.

ARSENAL gives you full-season control for up to eight months in temperate climates. It fits your spray schedule, because it can be applied at any time during the growing season. ARSENAL controls not only existing vegetation, but also new weeds that germinate after application. So you get residual control for the rest of the season. On hard-to-kill vegetation, ARSENAL keeps working on the roots until complete control is achieved. In spray solution, ARSENAL is stable for several days. That means no waste due to decomposition, and no chance of underdosing target vegetation.

ARSENAL offers broad-spectrum control, including these tough species:

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Green Industry News *continued from page 14*

other wildlife when used according to labeled directions.

"(Research development specialist) Ken Rose cites a comprehensive review of university, government and Dow research on bird toxicity which was compiled by Eugene Kenaga, a now-retired Dow researcher. The report concluded that 'chlorpyrifos (Dursban's active ingredient) presents no significant toxicological hazard to birds under normal use conditions.' "

PESTICIDES

Badge monitors pesticide exposure

A new badge will soon help pesticide handlers monitor their exposure to the chemicals.

Robert E. Baier, a professor of biophysics at the State University of New York at Buffalo, developed the green plastic badge, which contains a chemical that turns red upon contact with organophosphorous pesticides, such as malathion.

A worker can estimate his exposure by counting the number of squares on the badge that change colors. Baier recommends the badge be worn on the wrist, since hands usually become contaminated first.

Michael & Michael Consultants Ltd. of Buffalo, will market the badges this fall. In the future, the same technology will be used to monitor the distribution of pesticides in the field and to trace pesticide contamination of water supplies.

INDUSTRY

Sandoz acquires Velsicol agrichemicals

Sandoz, Ltd. has acquired Velsicol Chemical Company's agrichemical business from Chicago's Farley/Northwest Industries. A new company, VS Crop Protection, has been formed as a result of the acquisition.

Dale Miller, formerly vice president of Velsicol's agricultural business group, will serve as president and chief executive officer of VS Crop Protection. The new company will employ about 300 people at its headquarters in Chicago, and another 850 worldwide.

Miller says the company's plans lie in three areas. First is new product development, second is pursuing specific market niches and third is commitment to customers.

TURF

Disease kit aids in disease identification

Agri-Diagnostics Associates has formed an agreement with O.M. Scott & Sons Company for marketing kits which diagnose turfgrass diseases.

The kits are based on monoclonal antibody technology and use a dipstick format. The kit provides early and accurate diagnosis of pythium blight, brown patch, and dollar spot. This makes management of fungal diseases easier.

"This introduction represents a major step forward in the application of biotechnology to the diagnosis of plant diseases," says Steve Banegas, general manager of Agri-Diagnostics.

Test marketing for golf course applications began this year.

PEOPLE

Stottern succeeds Baston at GCSAA

Riley L. Stottern of Park City, Utah, is 1986 president of the Golf Course Superintendents Association of America, succeeding Eugene D. Baston of Waco, Texas.

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"What's more, The Andersons' new production facilities are computerized and state-of-the-art. That means accuracy and precision control of the formulation process which is critical to consistent product performance.

"We're confident that turf care pros looking for reliability in fertilizer/insecticide combination products can always find it in The Andersons' Tee Time products with Dursban."

David H. Naffziger

David H. Naffziger, M.S.
Product Development Manager,
Dursban Insecticides
The Dow Chemical Company

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Ted Pankau, Steve Ramig and **Mike Hensen** join Jacobsen Div. of Textron as marketing communications writer, commercial products marketing manager and internal administration manager, respectively.

E.R. (Ted) Roberts has been promoted from executive vice president of Eli Lilly International Corp. to president. The 25-year Lilly veteran is a native of Wales.

Ted Pankau

E.R. Roberts

John Anthony Caputo, a graduate of Idaho and Oregon State Universities, joins Seed Research of Oregon as senior agronomist.

Jim Kenservik is new traffic manager for the Oregon operations of Jacklin Seed Co. And **Richard C. Dunham** is new marketing manager.

Robert Bartlett Jr. is new president of the National Arborist Association. The graduate of the University of Georgia has been on the NAA Board of Directors since 1977.

John Caputo

Jim Kenservik

Robert J. Pace and **James R. Vaughan Jr.** are appointed master sales representatives in the Crop Protection Chemicals Dept. of American Cyanamid's Agricultural Div. Pace handles the Boise, Ida., district and Vaughan the Raleigh, N.C., district.

Rick Dunham

Joe DeLuca is named to the new position of professional products marketing manager, Lawn Fertilizer Div., The Andersons. He had previously been advertising manager.

Larry Humphreys is key account senior tech rep for the Lawn Care Service Supply Group of the ProTurf Division of O.M. Scott & Sons. The Ohio State University grad had been a tech rep in telephone sales.

Larry Humphreys

Denny Church

Denny R. Church of Church Landscape Inc., Lombard, Ill., is 1986 president of the National Landscape Association, Washington, D.C. He is a past president of the Illinois Landscape Contractors Assocation.

Rex Dixon is new general manager of Richdel's Turf Div., Canoga Park, Calif. He was with Rain Bird Sales.

Club Car's New Carryall II Will Out-Tough Any Utility Vehicle In The Field

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Everything about the new Carryall II - the body, truck bed, power and drive train, accessories - has been designed with exclusive Club Car features to enhance performance, durability, reliability and safety. The Carryall II will out-perform competitors in every category.

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With the largest pickup bed (50" x 50" x 11") and biggest gross payload (one-half ton) in the industry, plus a standard trailer hitch with a towing capacity of 1,000 lbs., the Carryall II becomes the most functional, practical and economical vehicle around.

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Club Car's 4 Cycle/341 cc Engine*, the largest in the industry, gives the Carryall II the power to haul ½ ton loads without stress and vibrations.

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- Penetration up to 2 3/4″.
- Two weight options provided for increased downward pressure - a 38 lb. steel bar and/or steel drum that holds 55 lbs. of water.
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- Covers up to 21,000 square feet per hour.
- Tine wheel shaft and water drum shaft are equipped with two grease fittings and protected by felt seals to keep out dirt.
- 3 h.p. industrial engine with rotary stop switch for easy shut-off.
- Fuel tank holds two quarts.

Designed for the professional who wants to provide quality core-type aerification at a high rate of speed, the new Lawnaire IV is the most dependable walk-behind roll-type areator on the market.

More and more homeowners are asking for lawn aeration to break down thatch and improve turf quality. The Lawnaire IV offers lawn care professionals and rental outlets a core aerator that pays for itself in just weeks.

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Model 544863

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COVER STORY

LANDSCAPE PROFILE

ONE OF A KIND

Unlike its south Florida neighbors, Jupiter Hills Golf Club features characteristics you might find on a northern course—from the trees to the bentgrass greens.

by Heide Aungst, associate editor

Standing in the middle of Jupiter Hills Golf Course, you'd never guess you were in Florida—unless the balmy breeze off the nearby intercoastal waterway gave it away.

Certainly the softly rolling hills and absence of palm trees would yield no clues.

The course, located just north of West Palm Beach, has been designed to resemble one of its northern cousins, right down to the trees—oaks, mahogany, and pine—scattered throughout the property.

"There's no course like it in the state of Florida," says superintendent Dick Herr.

It's the second-toughest course to get a chance to play on in the state, behind the very exclusive Seminole Country Club in North Palm Beach. But Seminole's superintendent even visited Jupiter Hills recently to get some hints on improving his course.

A Midwesterner himself, Herr likes Jupiter Hills' "northern" look with a tropical climate. That's just what the superintendent from Logansport, Ind., a small farming community north of Indianapolis, was looking for when he packed his bags and headed south.

Herr had visited the club briefly before deciding to move to Florida. He was hired at Jupiter Hills as an assistant to the superintendent. Two months later, his boss left and Herr took over.

Jupiter Hills was known as a graveyard for superintendents under the reigns of owners Tom and George Fazio; rumors say that some 40 came and went before Herr. But Herr's easy-going manner has allowed him to survive—more than survive—for six years.

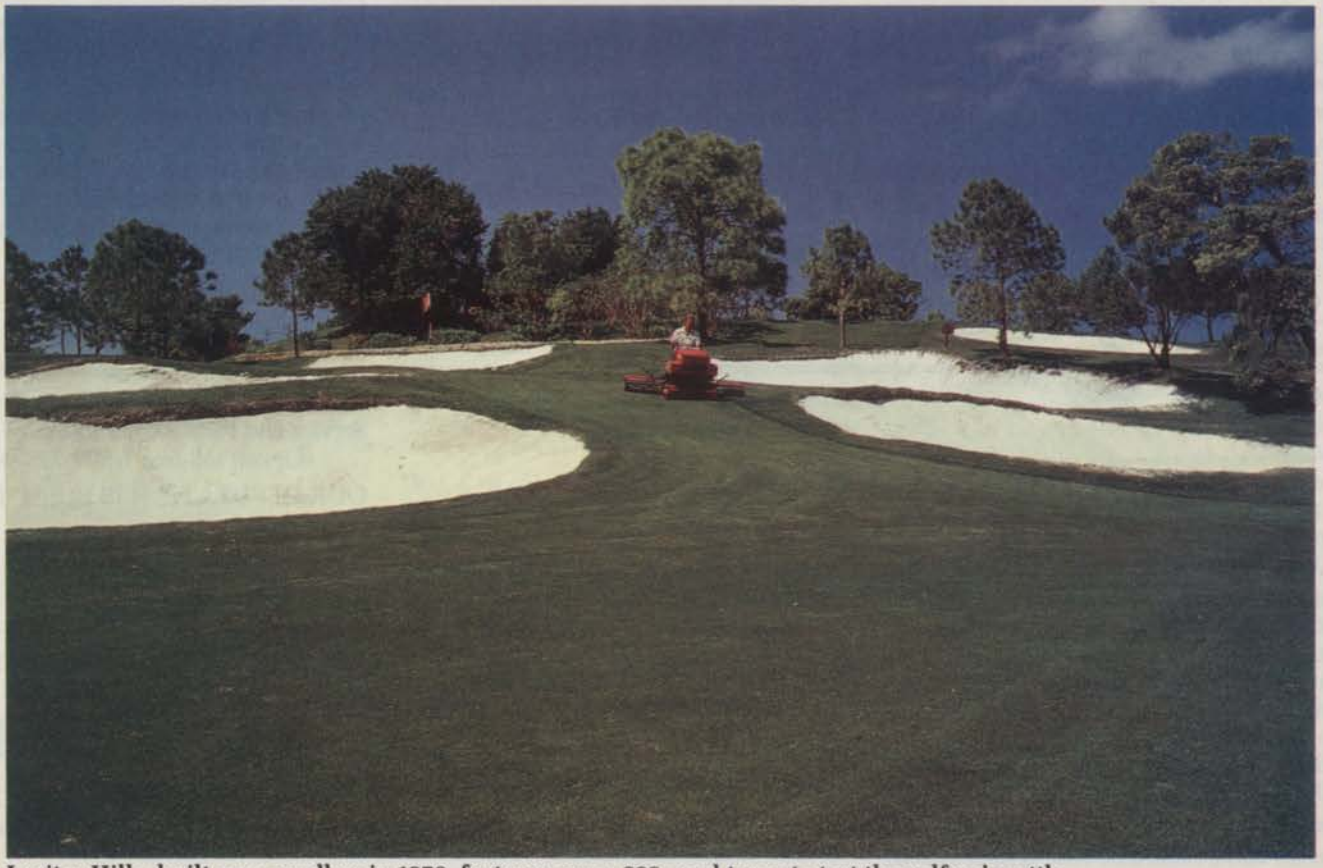
He has shaped the course to where it's one of the best in the country, No. 51, according to GOLF DIGEST. The U.S. Amateur will be played there during Labor Day weekend 1987, a first for the club.

A second course, Village Course, is built around a residential area.

The two courses were built on a sand bar (can you believe 200 sandtraps?) just off the ocean in 1970. Combined, the courses stretch 400 acres, 250 of which is irrigated. Herr is in the process of changing to year-round bentgrass greens.

A bentgrass overseeder

The usual process at area courses is to overseed each October with ryegrass or bentgrass. Herr uses



Jupiter Hills, built on a sandbar in 1970, features some 200 sand traps to test the golfers' mettle.

Penncross bentgrass to overseed the base of Tifdwarf bermudagrass. He says rye bounces and is too slow. "My members wouldn't stand still for it."

Then in April, the bent is removed, and the bermudagrass grows in.

The theory behind the switch is that bermudagrass will turn brown in the winter, so overseeding is needed to keep the green color. The bermudagrass supposedly overtakes the bent in the summer, thus the switch back to bermuda. Courses just a bit further south, in the Miami area, don't need to overseed since bermudagrass grows throughout the year.

But Herr figures if he can keep bentgrass green in a sweltering Indiana August, he can keep it green in Florida during any season. So far, his philosophy has worked.

He first pondered the idea three years ago and decided to watch the greens to see if the bent would grow stronger naturally without overseeding. Last year he started experimenting on the Village Course, and hopes this spring that he won't have to remove the bentgrass from the Hills Course. Not overseeding could save the course more than $15,000 a year in seed and labor costs.

Jupiter's members are much happier with bent greens; it is softer, with a smooth and accurate putt. Herr's members can be fierce critics. One of his members is on the greens committee at the renowned Winged Foot Golf Club in Mamaronek, N.Y.

Herr says the main reason other Florida supers don't use bentgrass is simply because they've been told it can't work. Many fear an invasion of pythium blight. But Herr says he hasn't had any problems with it.

"I don't syringe or use any special watering system," Herr explains. Though others insist that syringing is necessary on bentgrass to prevent pythium blight, Herr says someone would have to do a lot of talking to convince him of that.

No regulated watering system

In fact, he doesn't use a regulated watering system at all. Call it luck, but Herr insists that when he needs rain, it rains. When a green needs to be watered, he gives it just the right amount.

"You've just gotta know how much to use and when to use it," Herr says. "It only comes from experience. They're (greens) all different; none are the same. It's like having 18 different babies on a golf course."

The green at No. 17 shows finely manicured bentgrass prospering under the hot Florida sun.

And he treats his course as any proud father would.

His crew hand-mows the greens to avoid leaving a pattern from riding mowers. They aerify once a year, around the first of July.

The fertilizer program is as individualized for each green as the watering program. Herr's independent thinking has even led him to break the norm on what type of fertilizer he uses.

When the course was built, a consultant recommended a fertilizer program. But when Herr arrived, he decided the course didn't look good and he'd have to mix his own.

Although he hesitates at revealing too many secrets, he will give out his fertilizer recipe: two bags of sulfate mixed with one bag of Milorganite.

When it rains, regular fertilizers will wash off and the lush green color can fade. But the organic sludge mixed in helps transfer the fertilizer to the roots.

Herr is a rare breed among superintendents. Also a golf pro, his extensive playing and teaching experience gives him a deeper insight into what his members want from a course.

A pro at 17

As a boy in Indiana, Herr bought his first golf club for $10. He went out on a private course to play. The owner caught him and made a bargain: he could play for free if he caddied and worked on the course. Herr spent about four hours a day mowing greens and fairways, and the rest of his time playing the game. At 17, he turned pro.

But a twist of fate: that superintendent was killed in an automobile accident. Herr was offered the job, putting him face-to-face with the biggest decision of his life. To go on tour as a pro golfer, or to become a superintendent?

The thought of living out of a suitcase turned Herr off, so he took over as superintendent.

He never went to college, but learned all his tricks through experience and a sixth sense. Whatever Dick Herr thinks will work usually does, despite what so-called experts tell him.

George Fazio was his best teacher, the same man other superintendents ran from. "He's a perfectionist. He'd find fault with every superintendent," Herr says. "I think a lot of him. He's one of the smartest men in golf I've ever known. I learned more off him in two years than I probably will the rest of my life on the golf course."

Herr won't hire college grads, either, unless they have a wealth of experience backing them up. He prefers to train his staff which fluctuates from 20 to 25. The crew works seven days a week.

"I built my crew," Herr says proudly. "We all learn together like a family."

The course has gone through very few design changes. About eight years ago, hole Nos. 7, 8 and 9 were moved to the Village Course, and three new holes were built on the Hills Course. No more major changes are anticipated. "I think now we're set. We'll let it age on its own," Herr says.

Strong turf

The course has matured quite a bit since Herr arrived. It used to be six inches of rain would go right through the "sugar" sand soil. Today, the turf has developed root systems which help to hold the water.

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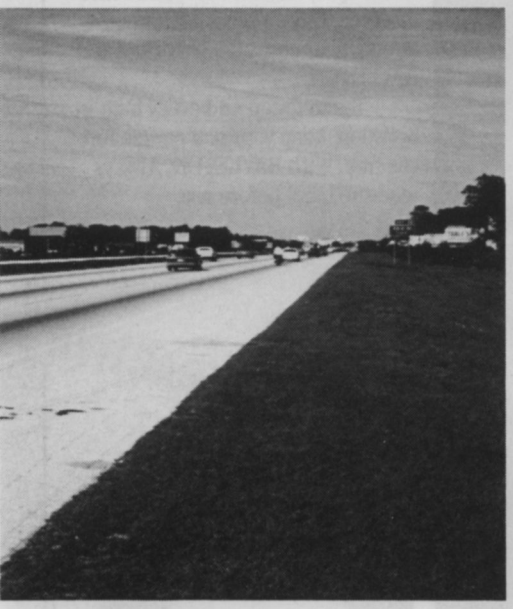
Circle No. 132 on Reader Inquiry Card

MILES TO GO...

Rights-of-way landscape managers, who do things on a big-big scale, favor spraying non-selective herbicides and tree maintenance. An exclusive WT&T survey examines this important segment of the green industry.



Readers of WEEDS TREES & TURF care for more than 16 million miles of right-of-way annually, according to a recent survey completed by the magazine.

Sixty-eight respondents to a questionnaire say they average 8,537 miles of right-of-way maintenance. Projected to the entire readership involved in this specialized type of landscape maintenance, that's a total of 16,675,000 miles of turf.

Nearly nine out of 10 (88.2%) rights-of-way managers practice weed control, and non-selective herbicides are their favorite choice of control. The survey notes that 79.4% of the respondents use non-selective herbicides on a regular basis and 64.7% use post-emergence herbicides.

Because 69.1% of the respondents are also involved in tree maintenance, it comes as no surprise that chain saws rank second only to sprayers as the most popular piece of equipment. Sprayers are used by 85.3% of the departments responding and chain saws by 80.1%.

Rights-of-way maintenance departments come in two sizes: large and small. The average department has 317 employees, but 87.6% of the companies in the survey have fewer than the average.

With an average of 317 employees and an average 8,537 miles of maintenance per company, that means that the average employee is charged with maintaining 27 miles of right-of-way.

What is in the future of right-of-way maintenance? A wider range of plant growth regulator (PGR) use, for one. One industry expert told WT&T that he expects use of PGRs among rights-of-way managers to increase 10-fold each year for the next 10 years. And many of the survey respondents agree.

"Growth regulators may be promising," says one respondent simply.

The current scenario whereby anti-chemical groups are complaining about pesticide use also has R-O-W managers worried.

"We need to educate the public to the benefits of chemical weed control," says one respondent.

Because so many rights-of-way landscape managers are involved in spraying herbicides, it is no secret—judging by survey results—that they would like more efficient chemicals and equipment.

"We need the use of a good bermuda release herbicide like Oust," says one respondent. "Even better ones will improve efficiency and safety.

"And spray tips capable of spraying in the 40- to -50-foot range with a good pattern, using no boom, are also needed."

Another manager foresees this in the future: "more sophisticated computerized spraying equipment

RIGHTS-OF-WAY LANDSCAPE MANAGEMENT

Popular chemicals

CHEMICAL	USED BY
Non-selective herbicides	79.4%
Post-emergence herbicides	64.7%
Pre-emergence herbicides	45.6%
Plant growth regulators	39.7%
Mulches	39.7%
Drift retardants	38.2%

Popular equipment

PIECE	USED BY
Sprayers	85.3%
Chain saws	80.1%
Rotary mowers	75.0%
Brush cutters	63.2%
Post-hole diggers	39.7%
Tree pruners	39.7%
Aerial lifts	38.2%
Spreaders	38.2%
String trimmers	38.2%
Seeders	35.3%
Flail mowers	32.4%

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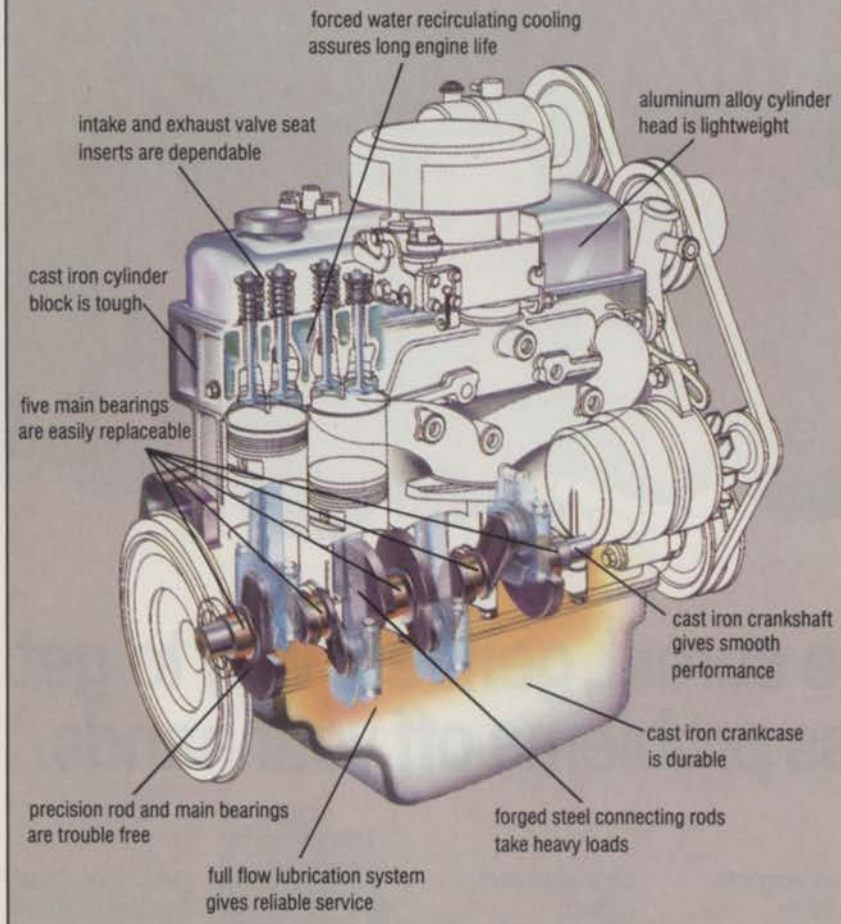

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R-11/14

Circle No. 148 on Reader Inquiry Card

PROFILE *continued*

using tank combinations at minimum rates for broad spectrum control, and new herbicides where rates are ounces or less."

New technology, then, is of utmost importance. Witness this response from California Transportation Superintendent Robert Fowler: "Long range, there has to be a better method. In spite of the equipment, volume and material advances, we are still putting out herbicides similar to the way it was done in 1948."

Fowler says the R-O-W segment of the green industry needs low quantity materials, formulations to reduce dust, and development of low volume techniques to control drift.

Finally, one respondent sums up:

"We need more efficient herbicides that will have a wider spectrum of control and more advanced and efficient spray rigs having a wider range of tanks where more than two or three types of spraying can be done all at once."

This is the future of rights-of-way landscape management. **WT&T**

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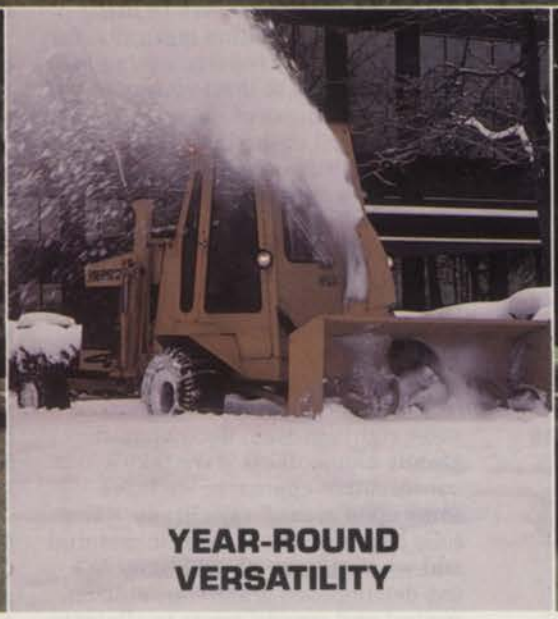

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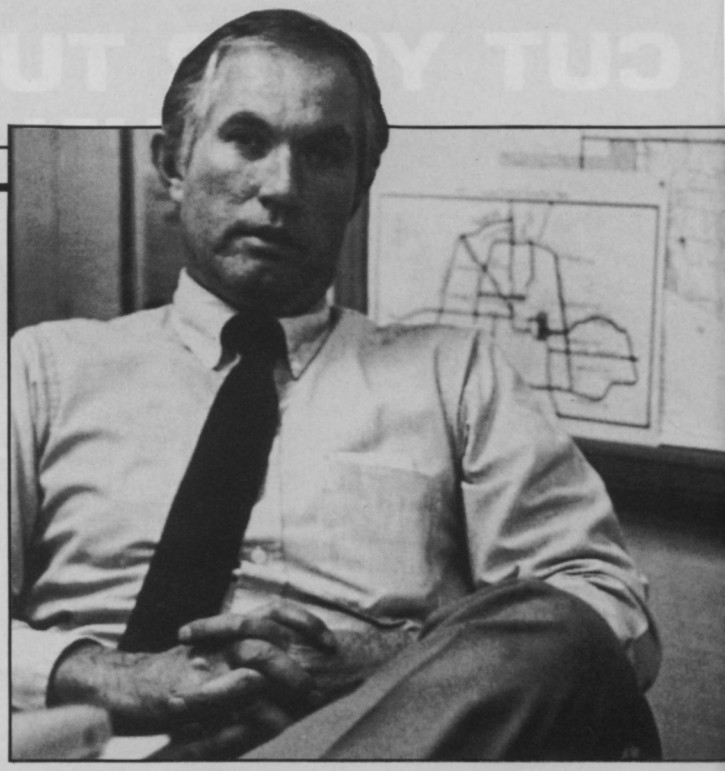
LANDSCAPE PROFILE

UNDER CONSTRUCTION

Growth in the booming Valley of the Sun and surrounding areas presents a challenge to the Arizona Dept. of Transportation's Highway Division. Another challenge: landscaping in a furnace-like environment.

by Carl Kovac



LeRoy Brady, manager of roadside development for the Arizona Dept. of Transportation, says water conservation and aesthetics are factors to consider when developing a roadside landscape.

In Maricopa County, Ariz., the shortest distance between any number of points is—or will be over the next couple of decades—under contruction.

By 2005—if all goes well—Phoenix, the state capital and county seat, will be ringed and bisected by freeways which, among other things, will make it easier to get to surrounding cities such as Mesa, Tempe, Chandler, Glendale, Scottsdale, and Sun City, not to mention the West Coast and points east.

These highways will be more than just six-lane concrete ribbons snaking across the sprawling Valley of the Sun; they'll be bordered by landscaping in tune with the Grand Canyon State's unique ecology.

There are good, pragmatic reasons for this, not the least of which are water conservation and aesthetics.

Average annual rainfall in Maricopa County is a mere 7.03 inches. The Tucson area to the southeast gets about 11 inches a year and Prescott, to the northwest, 17 to 18 inches. Of the county's 9,127 sq. miles, only 98.2 sq. miles are water—lakes, rivers and canals.

Low water, low maintenance

These figures become quite significant in light of the fact that Maricopa County is the largest producer of crops and livestock in the state.

"By and large, we'll be using desert, low-water requirement plants along rights-of-way," says LeRoy Brady, manager of roadside development for the Arizona Dept. of Transportation's Highway Division. "Desert-type landscaping minimizes use of closely planted growth and maximizes use of large trees and shrubs, giving a green landscaping appearance and reducing water use."

A variety of natural and hybrid plants—some of foreign ancestry—have been selected to grace Arizona's highways. "We're using Chilean and Argentine mesquite, for example," Brady reports, noting that "they're native to their countries, but in the process of nursery development in the U.S., they became hybrids. We're also planting eucalyptus, which is native to Australia."

Other trees, shrubs and ground cover finding homes along roadways throughout Arizona include blue and Sonoran palo verde, desert willow, acacia, cassia, myroporum, oleander, and verbena.

Turf is being used along parts of some rights-of-way, decomposed granite along others. "We take a conservative approach; we leave some open areas," says Brady. "The soils here are low in organic material and when it's dry, they'll blow. We use decomposed granite for erosion control and ground cover to alleviate the dust you get from native soil."

The AMA list

What gets planted where throughout the state depends largely on the availablity—or lack thereof—of water. With this in mind, Active Management Areas (AMAs) have been designated and will go into effect in Phoenix, Prescott, Casa Grande, and Tucson Jan. 1, 1987.

As of that date, says Brady, any plants not on the AMA's low-water requirement list will not be planted along rights-of-way. "In the Phoenix AMA, for example, no turf will be planted after the first of next year," he says. "Each of the AMAs will be working to reduce per capita water consumption. In Phoenix, it's 170 gallons a day."

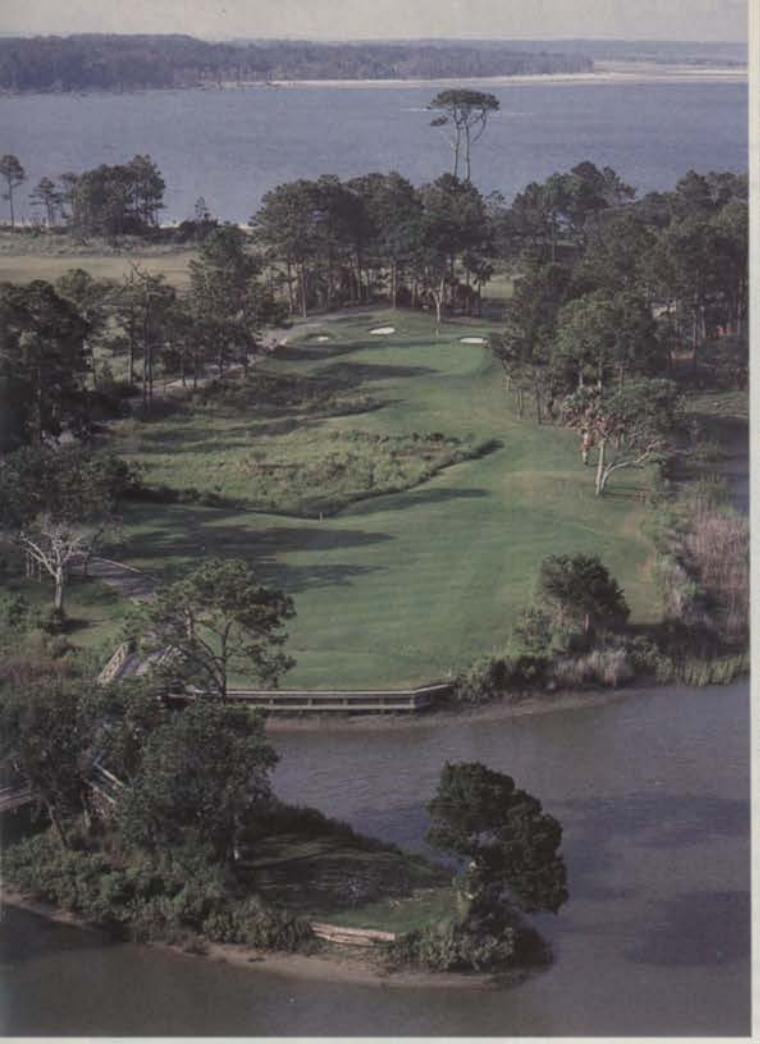
Beautification also is a major factor in the scheme of things, Brady notes, pointing out that "neighborhoods are most certainly concerned about how highways going through their communities will look."

In some cases, development has started before road construction has begun, with the tacit understanding that these highways will be landscaped.

Chandler, Mesa, and Tempe to the southeast of Phoenix and Glendale to the northwest in particular are experiencing major growth; the first three because large tracts of land are available for residential and industrial development and Glendale, because a growing number of high-tech firms are finding their way there.

Interestingly, it is the very climate that dictates highway landscaping in Maricopa County—average annual highs of 85.1 and lows of 55.4 and low humidity—that is bringing high-tech companies to the valley. An abundant

—Carl Kovac is a freelance writer based in Cleveland.



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Arizona highway landscapers use a variety of low-water requirement desert plants and decomposed granite to beautify roadway and suppress erosion.

labor pool and the proximity of Arizona State University's college of engineering hasn't exactly hurt the industrial influx.

And new industry, high-tech or whatever, brings new people, younger people—some 10,000 a month, according to the Greater Phoenix Chamber of Commerce. Many of them buy homes and a community's environs can be a heavy deciding factor in where they buy.

A highway's look does matter

"A point hardly ever made with highway landscaping," Brady notes, "is that the appearance of a freeway has a major impact on the people who drive them and who live in the communities along them.

"It creates a positive image if it's an attractive freeway. Things like texture control and color accents just create an overall comfortable feeling. Conversely, if you don't have landscaping, you can have a very real negative impact. Is a developer going to put money into improvements in land adjacent to an undeveloped freeway?

"Here's another point that should be considered," he continues. "If you construct a freeway and delay landscaping three, five, eight years, that's the image of what the freeway is. Even after you begin planting, it takes another three years before the freeway looks good.

"In our desert environment, we have to pay attention to growing sequences fairly soon after construction so that the highway is a contributor to the urban/suburban environment. Fortunately, you can incorporate all kinds of water methods in an aesthetic approach."

Low-level chemical use

Because roadside plantings are a hardy desert breed, maintenance is not a big concern.

"Insects are not one of our major problems," Brady reports. "We don't do an awful lot of spraying. When we do, we use a variety of herbicides, depending on the area. Short-term, pre-emergent herbicides are used to control weeds in urban landscape plantings; in rural areas, around road signs, guards rails and delineators, we go to longer-term chemicals. We have to be careful what we spray and where. This is a big agricultural area—citrus, cotton, and vegetables."

There are weeds to contend with; pig weed, sunflowers, telegraph weed, Russian thistle, and camel thorn, among others.

"You see some real weird things growing along the roads here," says a landscape worker.

"What happens is that we don't have a lot of rainfall, so that when it does rain, water collects along the side of the road. Along comes a truck from back East with seeds stuck in its tires, or a cattle truck dropping excrement loaded with seeds. The seeds germinate in the roadside water and you get a new weed, like Texas mesquite."

When the new highways are built, there will certainly be more transient trucks and, undoubtedly, more "weird" weeds. **WT&T**

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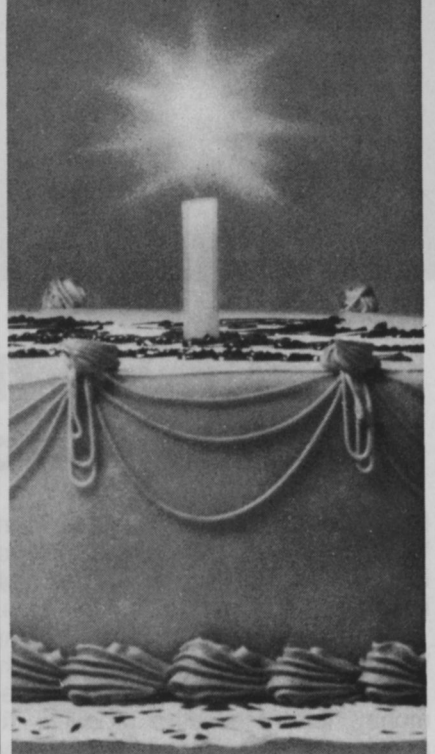

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County worker Dave Brackin uses a 200-gallon rig to control Johnsongrass.

WEED ERADICATION

In sunny San Bernadino, bare ground next to the roadside is the aim of county agriculture workers.

by Ken Kuhajda, managing editor

There's plenty of room for weed growth in the nation's largest county. But, fortunately, most of the 20,000 or so square miles of San Bernadino County in Southern California is desert where weed growth isn't a problem.

In the sprawling county's non-desert areas, though, weeds and other climatic conditions like the annual Santa Ana winds throw a challenge to county deputy agriculture commissioners John Gardner and Tom Baird, and their staffs.

Weed control is but a small, yet important, part of their jobs.

Gardner's responsibility is pesticide management (application) of roadside weed control. Paradoxically, Gardner also heads pesticide enforcement.

"We have kind of a schizophrenic role of enforcement and service combined," says Gardner, holder of a master's degree in pesticide management from the University of California at Riverside.

Baird, a 20-year agriculture department worker, supervises fire hazard weed abatement. Both say their main function is enforcement of county codes.

Baird also oversees soil erosion control, issuing permits to farmers who've devised a plan to control the effects of the annual Santa Ana winds. From September through April, the sometimes 100 mph northeast winds can roar down the Cajon Pass, stirring up dust and creating major problems. Says Baird: "We've had trucks blow over."

The seasonal Santa Anas cause concern, but Baird's main responsibility is fire hazard weed abatement. That's a year-round project, although the threat of fire is less during California's rainy winter season.

That rainy season means more work for the roadside weed control workers.

Roadside control

Deputy commissioner Gardner is a relative newcomer to roadside control, having assumed the duty after a reorganization earlier this year. He's been with the San Bernadino agriculture department eight years—as a field aide, biologist, supervisory biologist (in pesticide use enforcement), and finally deputy commissioner. He earned the position in 1984.

Along the way he garnered experience in pesticide use enforcement but received little training in pesticide application.

He's taken a crash course in the last six months, at the same time trying to avoid the problems his department looks for. "We probably look into anywhere from one to 10 problems per week," says Gardner. That helps his workers while they are applying pesticides. They recognize a problem situation.

Among the herbicides used by department workers: amitrole, bromacil, diuron, diquat, glyphosate, simazine, and sulfometuron. Department workers are not using PGRs, but Gardner says they may in the future.

"Our workers know what they should be doing and the answers to most questions. Their education is continuous. They attend seminars and training sessions," he says.

All are college graduates (the county agriculture department hires only college grads for field and management positions), two are trained in pesticide use, and three are generalists. All are licensed pest control operators.

Contract workers

The weed control division of the county agriculture department operates mainly by performing work for the county's towns and cities, which in turn, repay the department for the services.

The payback system, common in California, works well, says Gardner. "We offer weed control as a service to the public and we do it at cost," he says.

The county owns four 1,000-gallon spray rigs, one 200-gallon rig, and one 50-gallon rig. "It's rare when we have all four large rigs running at one time," says Gardner.

San Bernadino County is not in the chemical storage business. Trucks returning at day's end with

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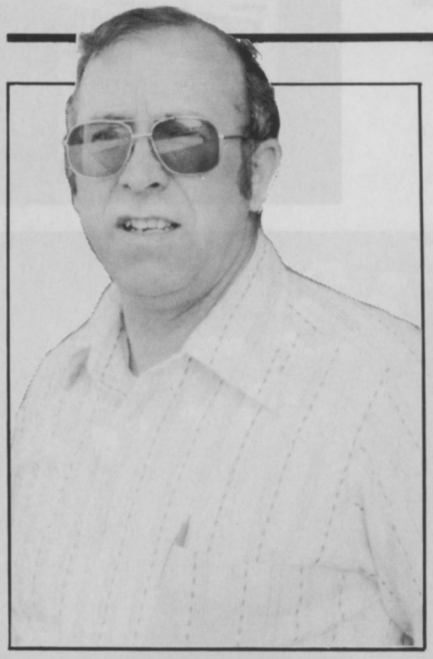

Tom Baird (left), agriculture deputy commissioner, San Bernadino County, has been with the department since 1966. Fellow deputy commissioner John Gardner (right) fields a point of concern from "Holly" Hollingworth, operator of Hydrex Pest Control Co.

Bare ground next to a roadside is cause for joy in San Bernadino County. This road runs through Rancho Cucamonga.

chemicals still in the tanks are sent back out to spray until empty. "We have no intention of getting into the mass liquid storing business," Gardner promises.

Activity peaks during the winter season with pre-emergent work. The goal, says Gardner, is bare ground along the roadside. Application of pre-emergence herbicides continues into March and then post-emergent control begins.

The San Bernadino roadside weed control division is not involved with roadside landscape, says Gardner. Consequently, you won't see the complicated landscapes you see in neighboring Los Angeles or Orange counties.

The intersection of I-10 and I-215 in San Bernadino is being landscaped, says Gardner, but by a private company.

And after the weeds...

Weed control, an important function within the large county, is but a small part of the overall duties of the county agriculture department. Workers must be schooled in other areas.

Biologists must take an eight-part exam, including sections on pesticide use enforcement and weed control, to become state certified.

The other sections are plant quarantine and pest detection; nursery and seed regulations; insect and disease pest management; fruit, vegetable, and egg quality control; vertebrate pest management; and apiary regulations.

After passing all eight parts, an employee must then pass a management test if he or she wishes to become a deputy commissioner.

In San Bernadino County, four deputy commissioners (Gardner and Baird, plus Rich Campana and Don Schreiber) answer to agriculture commissioner Roger Birdsall.

Ed Layaye serves an office management function as chief deputy commissioner. Some 40 employees staff the agriculture department.

Deputy commissioner Baird supervises 15 workers, including nine hazardous weed abatement officers.

After inspection, a weed abatement officer decides whether an area presents a hazard (90 percent of the of the time, the hazard is in the form of grass or weeds, says Baird). If so, the owner is informed and asked to remedy the situation.

If he doesn't, a private contractor is called in to clean the mess and a bill is sent to the owner. Some 24 contractors work for the county agriculture department.

If the owner doesn't comply, then he's subject to a fine. Most cases don't get that far, says Baird, a native of Meadville, Pa.

He still gets out to do some field work but lately the managing of the weed abatement division budget has cut his field time to 50 percent. That's enough for him.

"There's a lot of freedom in this job. I'm pretty much my own person and I enjoy that. The commissioner and assistant don't hover over you, they let you do your own thing," says Baird. **WT&T**

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Circle No. 107 on Reader Inquiry Card

PGRs FOR HIGHWAY TURF

The use of PGRs has led to the concept of 'chemical mowing,' the idea being that growth suppression will minimize or eliminate the mowing requirement.

by Drs. T. Karl Danneberger and John R. Street
Department of Agronomy, The Ohio State University

Vegetative and seedhead suppression of Kentucky bluegrass with Embark (left) compared to an unmowed check (right).

As state and local governments struggle with fiscal restraints, transportation departments are looking for ways to minimize highway maintenance costs.

Mowing highway rights-of-way is a multi-million-dollar-a-year cost—not including the private and government monies spent on mowing along power lines, airport divider strips and railroads. By eliminating or reducing the number of mowings, substantial savings in manpower and fuel costs could be achieved.

Some attempts, which have been successful on a limited scale, have been made to reduce mowing costs by turning highway rights-of-way into wildlife areas or landscaping the area with plant materials that do not require mowing. But due to safety factors, indirect costs or impractability of these alternatives, the vast majority of highway rights-of-ways are still mowed.

The use of plant growth regulators (PGRs), chemicals that retard plant growth, on turfgrass has led to the concept of "chemical mowing," the idea being that growth suppression will minimize or eliminate the requirement of mowing.

Because of the increase in the number of PGRs on the market and the publicity they get, are they a hot new item? In a lot of ways they are. However, PGRs in some form have been around for a number of years. One of their first uses was targeted to highway rights-of-way.

Growth regulators have not, in the past, received large scale acceptance because of certain limitations, although their use will undoubtedly grow.

An ideal PGR

Characteristics and performance of turfgrass growth regulators vary. Ideally, a turfgrass growth regulator should exhibit the following characteristics:

1. Reasonably long residual activity.

2. Inhibition of seedhead and stalk formation.

3. No objectionable discoloration or chemical burning of the turf.

4. Control or suppression of broadleaf weeds.

5. No reduction in turfgrass quality with repeated usage.

6. Low toxicity to desirable vegetation, and no long-term residual.

No growth regulator currently on the market possesses all of these traits. So the use of PGRs requires an understanding of the situation and the desired end result.

For example, highway rights-of-way turf quality can be lower than that required in a home lawn. Turf quality on a roadside, observed at 55 mph, is considerably different than the turf seen while standing on a home lawn.

A PGR for highway rights-of-way should provide relatively uniform vegetative suppression. This requirement is not as important as with a higher maintained turf, but enough that the turf appears uniform at 55 mph.

A lack of vegetative uniformity may necessitate mowing sooner than desired. PGR effectiveness on a wide spectrum of plants, including grasses and broadleafs, is critical to long-term maintenance of vegetative uniformity.

A PGR for highway turf should have low toxicity to the desired vegetation. Highway rights-of-way are low maintenance turf areas that undergo enough stresses through the year without having to deal with excessive chemical stress.

Excessive phytotoxicity in combination with repeat treatments can cause thinning of the turf.

A PGR for highway turf should have at least a five- to- six week residual. If vegetative suppression is less than five weeks, the reduction in mowing num-

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TABLE 1
Growth Regulators Available for Turf

Generic Name	Trade Name	Manufacturer	Vegetative Suppression	Seedhead Suppression	Root Absorbed	Foliar Absorbed	Broadleaf Weed Suppression	Restriction of Roots & Rhizomes	Phytotoxic[a]
Maleic Hydrazide	Several	Uniroyal Chemical	X	X		X		X	moderate-severe
Mefluidide	Embark	3M Corporation	X	X	Some	X	Some		low-moderate
Flurprimidol	Cutless	Elanco Corp.	X		X	X			low-moderate
Amidochlor	Limit	Monsanto Corporation	X	X	X				low-moderate
EPTC	Short-Stop	Stauffer Company	X	X	?		X		severe on fine turfs (recommended for tall fescue)

[a]*Phytotoxicity can depend on environmental conditions, plant health and cultural practices.*

bers is not significant. On the other hand, season-long suppression would be undesirable because a plant needs to grow to rejuvenate itself.

An important characteristic for a highway PGR is the ability to suppress seedhead formation. Some grasses and weeds form extremely high seed stalks. If a PGR does not suppress the seed stalk, it defeats the whole purpose of the PGR. A mowing would have to be done to remove the seed stalk.

In low maintenance areas, such as highway turfs, broadleaf weeds are a component of the turf. Suppression or control of these weeds is an important consideration in using PGRs. A common practice is tank-mixing a PGR with a broadleaf weed killer such as 2,4-D, which can easily control weeds such as dandelion, dock, wild carrot, pigweed, plantain, and thistle.

Grass growth & development

Deciding on the "ideal" PGR for highway turf requires the user to understand the effect PGRs have on plant health.

Growth regulators, unfavorable environmental conditions, or other factors that retard tiller and leaf initiation and development can result in a reduced population of leaves and tillers, lower turf density, and, in turn, reduced grass quality.

A reduction in grass density will also favor the encroachment of undesirable weed species, further detracting from quality.

Lateral shoot growth and the development of new shoots from vegetative buds on rhizomes and stolons enhance the recuperative potential and rate of many grass species (e.g. Kentucky bluegrass and creeping bentgrass). Recuperative potential is especially important on grass sites that are injured by traffic or other mechanical or biological factors.

Suppression or control of weeds is an important consideration in using PGRs.

Growth regulators inhibit the initiation and/or development of secondary lateral shoots. Interference in root initiation and development will obviously deter from the maintenance of high quality turf. Growth regulators have been shown to interfere, to some extent, with these normal root renewal processes.

Plant growth regulators

The current PGRs available for turfgrass use are listed in Table 1.

Maleic hydrazide was the first growth regulator available for turf, and has been used in rights-of-ways in a number of locations. It suppresses turfgrass growth by inhibiting cell division in the shoots, roots, and buds of the turfgrass plant. Maleic hydrazide's broad activity in the root and bud areas has caused restricted root and rhizome growth of Kentucky bluegrass. Its use has been limited primarily to low maintenance areas because of possible phytotoxicity and excessive inhibition of plant growth under stress.

Mefluidide (Embark) is one of the newer plant growth regulators. Mefluidide suppresses vegetative growth and seedhead production, and inhibits cell division and meristematic activity in plant areas that contact this PGR. It is absorbed by the foliage, but is not as readily translocated in the plant as maleic hydrazide. This is a possible reason that root and rhizome suppression does not appear to occur with mefluidide.

Flurprimidol (Cutless) is also a new PGR that has good vegetative growth suppression and some weed suppression. Flurprimidol has been ineffective for seedhead suppression in some research studies. Its inability to consistently inhibit seedheads is a negative factor in highway rights-of-way situations. However, combinations of flurprimidol and mefluidide are alternatives where seedhead suppression is desired. Flurprimidol has shown some activity

Continued on page 46

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Everett Mealman
President
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It means that now you can have deep, vibrant, healthy green turf without an unwanted overdose of fertilizer which could lead to all sorts of problems and exposure to disease.

No wonder we are so eager to get a sample of Ferromec in your hands. But, meantime, we urge you to take a minute or so to better understand why iron is such an elusive material, and how PBI/Gordon has managed to harness it for you.

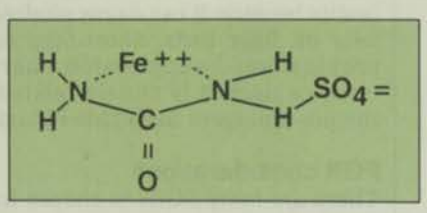
Ferrous Iron is Very Fragile.

As you know, the basic problem of supplying iron to turfgrass is its fragility in the Ferrous++ state. Only Ferrous iron can be utilized by a plant and, *ironically,* almost as soon as Ferrous Sulphate is applied it turns to the non-usable Ferric+++ state. Once oxidized, the reversal with organic matter acting as a reducing agent is so slow there is a question if it would ever occur.

And thus it is that scientists devised chelating, which is intended to fix the iron molecule in the Ferrous state. If chelating is properly done, it is effective.

Half of this green at Hodge Park Golf Course in Kansas City was sprayed with Ferromec and, within 24 hours, the color change was dramatic. Under normal growing conditions, visual response usually occurs between 8 and 48 hours after application. However, if moisture and temperature extremes exist, the response may be slower. Ferromec is also effective on trees, shrubs and herbaceous plantings.

Iron that Produces Within 24 Hours



This is the molecular structure of Ferromec. Note that ferrous sulphate is bonded to a urea molecule and will remain stable. Ferromec utilizes a recombinant urea process to achieve the unique composition. It is classified as an organometallic compound.

But it is very expensive and so slow to release that it could be many weeks before a treatment of chelated iron could produce a significant color change in the grass.

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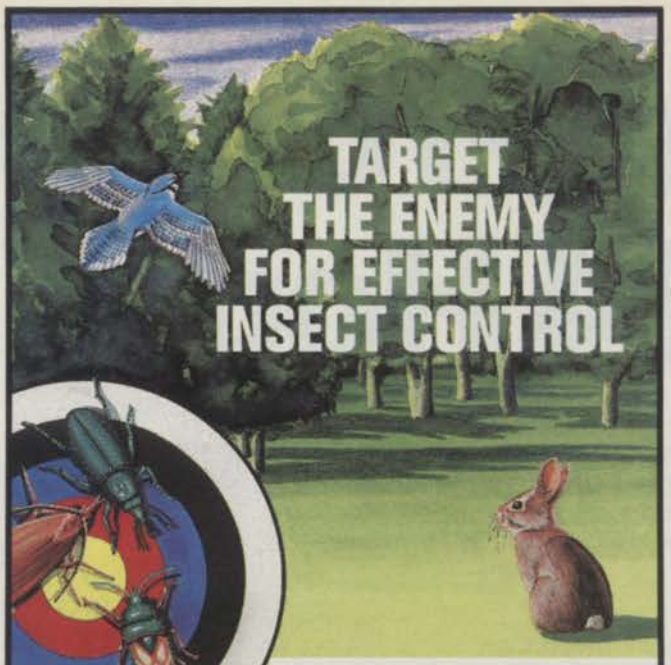

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Circle No. 127 on Reader Inquiry Card

PGRs *from page 42*

on poa annua suppression (control) in fine turf situations.

Amidochlor (Limit) is a root-absorbed PGR, thus requiring moisture within 3-5 days after application to wash it into the root zone. Amidochlor has shown both vegetative and seedhead suppression. No apparent root growth suppression has been associated with amidochlor.

EPTC (Short-Stop) is a new PGR that is recommended for use on tall fescue because it can cause phytotoxicity on finer turfs. Short-Stop does provide weed suppression characteristics since it is closely related to the pre-emergent herbicide Eptam.

PGR considerations

There are more PGRs to choose from then ever before. With the new PGRs and new experimentals being tested, the future looks promising.

The slow growth rate of turfgrass plants treated with a PGR retards the recuperative potential of the plant.

One note of caution is to always analyze the situation in which you use the PGRs. A PGR may show differential activity for different grasses.

For example, tall fescue and perennial ryegrass are generally more difficult to suppress than Kentucky bluegrass. Plant growth regulators by their nature inhibit the renewal process of turfgrass plants. Renewal of leaves and tillers is a necessary process to sustain quality turf.

Plant growth regulators, unfavorable environmental conditions or any factor that reduces tiller and leaf initiation results in lower turf density. Lower density can favor weed encroachments, loss of turf/soil stability, erosion, excessive water runoff and other related problems.

Disease incidence has been more prevalent on turfgrasses treated with a PGR. The slow growth rate of turfgrass plants treated with a PGR retards the recuperative potential of the plant.

These factors are important in deciding if a PGR is right for a specific situation.

On highway rights-of-ways, turf quality is of less concern than other factors, but functionality (density) with regard to turf/soil stability and erosion are critical in deciding on a PGR along with repetitiveness of its use and site selectivity. **WT&T**

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LIM-6-104

WEED FREE

For scenic roadsides, deeply-rooted plants are needed to successfully battle weeds for water and nutrients. That means developing a sound fertilizer program.

by C. Robert Staib, Nor-Am Chemical Co.

Only slow-release nitrogen should be used in the planting hole. This is also the best time to incorporate phosphorus in the planting medium.

"America the Beautiful" is an appropriately descriptive phrase, in part because of the country's highway system. Miles and miles of weed-free scenic roadsides are taken for granted by the traveling public. Only the landscape manager realizes the complexities of establishing and maintaining "that to which we have become so accustomed."

Developing a sound fertilizer program can help the landscape architect and horticulturist or agronomist to achieve their goals. Besides the beauty and functionality of roadside plantings, more vigorous growth helps keep a weed-free environment less dependent on expensive herbicide applications.

Healthy root systems

The long-term success of the roadside landscape is dependent on many factors, including availability of water, good drainage, and ability of plants to withstand effects of salt, auto exhaust emissions, and herbicides.

Roadside developers and agronomists know full well that maintenance resources are limited, and many times their plantings will have to fare for themselves. This is only possible when plant roots are firmly established, and thriving as deep as possible in the soil profile. The growth of plant vegetation is accompanied by a corresponding demand for carbohydrate reserves from the root system.

Healthy, deep roots, therefore, are vital to foster vigorous growth and plant density for long periods in diverse soils and weather conditions.

Key macro-nutrients

Most commercial fertilizers used in the landscape consist of synthetic organic nitrogen (urea, slow-release or coated products) plus reacted or mined phosphate and potassium sources (potassium chloride, also known as muriate, or potassium sulfate).

Nitrogen, phosphorus, and potassium, the major nutrients, are required by plants in the greatest quantity.

Of these, nitrogen is the most important, and is required in the highest amounts. Next in importance is potassium, required to sustain cellular structure and strength of the cell wall. Phosphorus, vital in the process of energy transfer within all living tissue, is nevertheless used in much smaller amounts.

Research shows that potassium levels of 50 percent of applied nitrogen (or even higher) are highly beneficial to turf. Except in extreme situations, residual soil phosphorus is generally sufficient to meet the needs of grasses and groundcovers once they become established.

Secondary nutrients

Calcium, magnesium, and sulfur are important in carrying out or supporting metabolic processes. These nutrients are also important in the development of soil characteristics favorable for plant growth.

Studies have shown that low rates of water-insoluble nitrogen applied in the sodbed prior to laying sod encourages rapid root growth. A firm early knit of sod is important on erosion-prone cut and fill slopes along roadsides.

C. Robert Staib, senior sales representative for Nor-Am Chemical Co., is based in Des Moines, Iowa. He is involved in sales and technical service to the turf and ornamentals market. This article was prepared for presentation to the National Roadside Vegetation Management Association, Kansas City, Mo., Oct. 8, 1985.

Tree planting positions are marked out with piles of slow-release ureaform. Auguring through the pile thoroughly mixes the fertilizer with the backfill soil as the hole is dug.

Calcium and magnesium are important components of organic matter which provide stability to soil aggregates.

These elements in the carbonate form help achieve a more neutral pH in acid soils, while sulfur is used to lower the pH of alkaline soils. A nearly neutral pH allows maximum availability and utilization of plant nutrients.

Minor plant nutrients include iron, manganese, zinc, copper, boron, and molybdenum. Except in very unusual situations, iron is the minor element most likely to be deficient.

High pH and high phosphorus levels in the soil can create iron deficiency. In both cases, iron is precipitated to insoluble, unavailable salts. Correcting soil pH and applying iron in fertilizer or as foliar sprays will correct the situation.

Nitrogen availability

The process by which fertilizer nitrogen becomes available in soil is called *mineralization*.

The rate at which urea mineralizes to ammonium ions (which then nitrify to nitrate nitrogen) is quite rapid, occuring over two to seven days at temperatures above 50 degrees F.

Nitrate (NO_3^-) nitrogen is the form most rapidly absorbed into the plant system. Highly water-soluble nitrate ions are subject to leaching, and in coarse soils excessive moisture can result in significant nitrogen loss.

Another avenue of N loss is via ammonia volatilization. In addition to ammonium ions (NH_4+) which are absorbed on clay and organic matter particles, some urea may hydrolize to ammonia (NH_3) which is subject to volatilization.

Improving plant vigor and density with a sound fertilizer program establishes an environment least favorable for weeds and scrub brush.

This is more pronounced in high pH soils, and can account for 25 percent or higher nitrogen loss. Nitrogen fertilizer made from ammonium salts, (e.g. ammonium sulfate, di-ammonium phosphate, ammonium nitrate, etc.), though water-soluble, are less subject to volatilization than urea.

Fertilizer programs

Few soils in a new right-of-way or rest area contain adequate major plant nutrients to forego applying commercial fertilizer. The establishment phase of roadside landscaping is the most critical in terms of assuring vigorous growth and long-term survival.

Spring is a good time to apply nitrogen, phosphorus, and potassium, and may be the only time that many miles of roadside vegetation will ever receive these important nutrients.

This is all the more reason to consider a nitrogen program that encourages strong rooting and extended availability over many months of growing season, though fall fertilization on cool-season grasses is also recommended if possible.

Commercial farm-grade nitrogen fertilizers are inexpensive and easily obtainable. However, they are water-soluble, release nitrogen rapidly, and generally have high salt indexes which can off-set their beneficial effect on new seedlings and small plants.

Besides the possibility of nitrogen loss, the faster release of N from these sources encourages too rapid growth of vegetative tissue. The consequences can be a shallow, less developed root system, poorly equipped to sustain grasses, trees, and shrubs through years of varied, often stressful growing conditions.

As previously mentioned, it is particularly important to get phosphorus down at the time of planting since it has its greatest influence on seedling establishment and root formation.

Since neither phosphorus or potassium move rapidly through the soil, regular farm-grade sources of these nutrients are both efficient and economical.

Low or no-N, high P-K fertilizers such as 6-24-24 or 0-20-20 are ideal sources of phosphorus and potassium, and are easily obtainable through farm fertilizer distribution channels.

Potassium's role in plants, both constructive and protective, is important in maintaining rigidity and integrity of cell walls, and helps to protect plants from disease and environmental stress.

Phosphorus is a key element in cell metabolism and energy transfer. Once plants become established under adequate levels of N, P, and K, the natural recycling of these nutrients from soil to plant to soil helps to satisfy long-term requirements. Also, deep roots can tap these elements where they exist at residual levels in the lower soil profiles.

The major nutrient

Nitrogen is so important in plant growth that it demands primary consideration when choosing a fertilizer. Several slow-release N sources are popularly used in landscape design.

If multiple applications of fast-release N sources are impractical, slow-release N fertilizers become a logical alternative.

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How much N, P and K?

Because of the author's experiences, recommendations are based on using ureaform nitrogen in a single application at planting time, or once a year or less often under maintenance conditions.

Other slow-release N sources are suitable for long-term effects, and should be considered over fast-release fertilizers for these infrequent applications. For the purpose of clarification, "luxury turf" is defined as that composed of improved varieties of turfgrass cultivars mowed and maintained for aesthetic appearance near buildings and along urban parkways.

Seedbeds, luxury turf

400 lbs. ureaform, 38-0-0, (152 lbs. N) + 400 lbs. 6-24-24 (or other high P-K fertilizer) per acre, applied separately* or blended.

Seedbeds, low-maintenance grasses and groundcovers

200-lbs. ureaform, 38-0-0, (76 lbs. N) + 200 lbs. 6-24-24 (or other high P-K fertilizer) per acre, applied separately* or blended.

(* In seedbeds, phosphorus and potassium will be more efficiently utilized over a longer period if incorporated in the top three-to-four inches of the soil prior to seeding. The nitrogen fertilizer should be surface-applied for best results. Mulching or slight incorporation will help prevent rainfall from moving particles away from the site of application.)

Under sod

115 lbs. ureaform, 38-0-0, (44 lbs. N) + 200 lbs. 6-24-24 (or other high P-K fertilizer) per acre. Equivalent to 1 lb. N per 1000 sq. ft. Slightly incorporate into the soil surface prior to laying the sod.

Established luxury turf

400 lbs. ureaform, 38-0-0, (152 lbs. N) + 200 lbs. potassium sulfate, 0-0-50, (or 150 lbs. potassium chloride, 0-0-60) per acre. Apply in spring or early fall.

Established low-maintenance grasses and groundcovers

200 lbs. ureaform (76 lbs. N) + 100 lbs. potassium sulfate, 0-0-50, (or 75 lbs. potassium chloride, 0-0-60) per acre. Apply separately or blended, spring or early fall.

Tree establishment (bare root or ball and burlap)

½ lb. ureaform, 38-0-0 + ½ lb. single super-phosphate, 0-20-0, per ½-inch trunk diameter.

Mix fertilizer with backfill to be replaced in the planting hole. *Application technique tip*.....Mark out the planting hole locations wih pre-measured amounts of fertilizer. Power-auger directly through the pile, automatically blending the fertilizer with the back-fill as the hole is dug.

A soil test may indicate that levels of phosphorus and/or potassium are adequate to sustain growth. If so, apply ureaform only. If potassium is required, it is best to apply it on the surface in order to dilute the salt concentration in the vicinity of the newly planted roots.

Seedling trees and shrubs

2 ozs. ureaform, 38-0-0, + 2 ozs. of a high P-K fertilizer, surface broadcast around each planting. In an area of many closely spaced plantings, surface broadcast 400 lbs. ureaform, 38-0-0, + 400 lbs. of 6-24-24 (or other high P-K fertilizer) per acre. Apply separately or blended.

Established trees and shrubs

Surface apply ½ lb. ureaform, 38-0-0, per inch of trunk diameter uniformly beneath the canopy.

Trees and shrubs almost always will exhibit a response to nitrogen fertilization. Trees showing an unusually pale leaf color may be suffering from iron chlorosis. This is mostly a problem in alkaline soils. It can be corrected with iron chelate.

—*C. Robert Staib.*

C. Robert Staib, Nor-Am Chemical Co.

The three most popular of these are SCU (sulfur-coated urea), IBDU (isobutylidene diurea), and ureaform. The mode of release from each of these varies considerably.

SCU, 32 percent or 37 percent, releases nitrogen by diffusion through cracks, pinholes, and fissures in the coating. Typically, a third or more of the N is released in one week following application, with the remainder available over the next several weeks.

However, any stress—mechanical or weathering—affecting the coating will increase the rate of diffusion. It is faster in warm soils, and particularly so following rapidly alternating wet and dry periods.

IBDU (31 percent N) releases nitrogen via hydrolysis to urea in the presence of moisture. Large particles of IBDU hydrolize more slowly than fine-grade product, and affect a more sustained release during wet weather. Little nitrogen is released from IBDU when moisture is lacking.

Ureaform (38 percent N) is a reaction product of urea with formaldehyde, forming carbon: nitrogen linked polymers of varying chain length and solubility.

The shortest-chain polymers are sparingly soluble in water, while intermediate and long-chain polymers are water insoluble. These polymers, or compounds, are known as methylene ureas.

Nitrogen is released by soil bacteria feeding on the polymers. The short-chain C:N linkages are more readily digestable.

Under growing-season conditions, about ⅓ of the N is released in four-to-six weeks, ⅓ at two-to-12 months, and ⅓ over one-to-two years. A slight residual amount will carry over to be available the third year following application.

Research at the University of Illi-

Penneagle crowds out bluegrasses on Butler National's fairways

Triplex fairway mowing at The Butler National Golf Club, Oak Brook, IL

When Oscar Miles, CGCS, of The Butler National Golf Club, introduced Penneagle creeping bentgrass into his Poa annua infested A-20 bluegrass fairways in 1980, he took a dynamic step toward the beautiful fairways praised by the pros during the Western Open.

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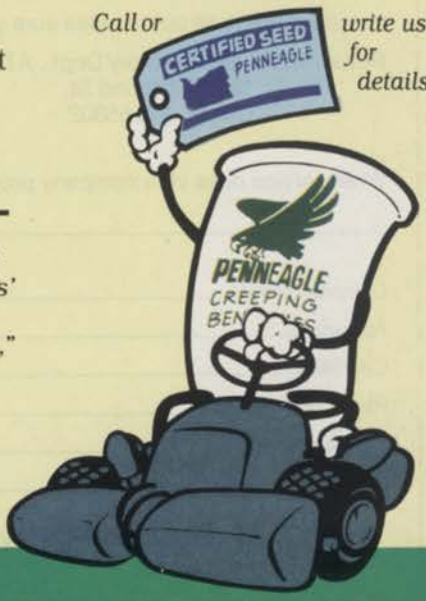

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nois has shown that ureaform is less subject to N loss from leaching or volatility than other turf-type slow-release fertilizers.

Other research at Iowa State University and the University of Nebraska has shown uniform turfgrass establishment and rapid root formation from sod and seed when ureaform was applied directly in the sod or seed bed.

Significant root development was exhibited during a three-week period immediately following an application of 1 lb. N per 1000 sq. ft. (equiv.) from ureaform on sandy soil under ryegrass sod disks.

This greenhouse test compared the effects of several N sources, including urea and IBDU. Phosphorous and potassium levels were uniform (2 lbs. P_2O_5 and K_2O each, per 1000 sq. ft.).

The spring season is the best time to apply nitrogen, phosphorus, and potassium, and may be the only time that many miles of roadside vegetation will ever receive these important nutrients.

Soil pH

The fertilizer program must take into account the pH of the soil. In acid soils, lime (calcium carbonate, $CaCO_3$) will raise the pH toward neutral (7.0) while elemental sulfur or gypsum (calcium sulfate) is effective in amending alkaline or sodium soils. Too acid or alkaline soils interfere with nutrient availability.

If such conditions are suspected, a soil testing lab can advise on corrective methods in either case.

Fertilizer as a weed manager

Improving plant vigor and density with a sound fertilizer program establishes an environment least favorable for weeds and scrub brush. Deeply rooted desirable plants compete successfully for water and nutrients, while a dense canopy restricts light availability to weed seeds lying in wait at the soil surface. The money saved on chemical weed control is but a small part of the total benefits to be realized when fertilizer is a primary tool in roadside vegetation management. **WT&T**

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TOUGH MARKETPLACE

Woven, nonwoven, or spunbound? Polypropylene or polyester? The nation's landscape fabric manufacturers are so convincing in their claims that a customer really doesn't know who to believe.

by Heide Aungst, associate editor

Geotextiles, commonly known as landscape fabrics, are becoming popular in the green industry.

But popularity can breed contempt.

Manufacturers of the weed control fabrics are becoming increasingly competitive. So much so, that it's difficult to know who to believe. Or, to know exactly which product does what.

Though no one seems to have exact statistics, industry leaders are clearly Du Pont, Duon, Dewitt and Warren's. Others, however, such as Easy Gardener, American Woven Fabrics, and Atlantic Construction Fabrics, are also making strides.

Polyethelene, a plastic film, was perhaps the first landscape "fabric" used underground to block weed growth.

Associated Bag Company of Milwaukee, Wis., still produces a "black plastic mulch" which many homeowners use. Don Belanger, Associated Bag's operations/products specialist, says his clientele is primarily industrial, not "in the plant growing business."

The creation of "breathable" fabrics, which let air and water through, has cut into the polyethelene business considerably. The only advantage plastic has is its cheap cost.

Polypropylene seems to be the most popular fabric. Its biggest disadvantage is that it can break down under the sun's ultraviolet (UV) rays. Some products are UV stabilized, which helps ward off (but doesn't guarantee against) degradation. And spraying a product for UV stabilization can increase its cost.

Polyester products are more expensive than polypropylene, but tend to last longer. Polyester is also strong, making it more suitable as a ground cover, for erosion control or for weed control.

Woven, nonwoven, spunbound?

Another difference in fabrics is in the manufacturing process. Is it woven, nonwoven, or spunbound (a subclass of nonwoven)?

Mirafi Inc. claims it was the first company to manufacture and market a nonwoven geotextile in the United States. In 1977, Mirafi introduced woven fabrics for ground stabilization.

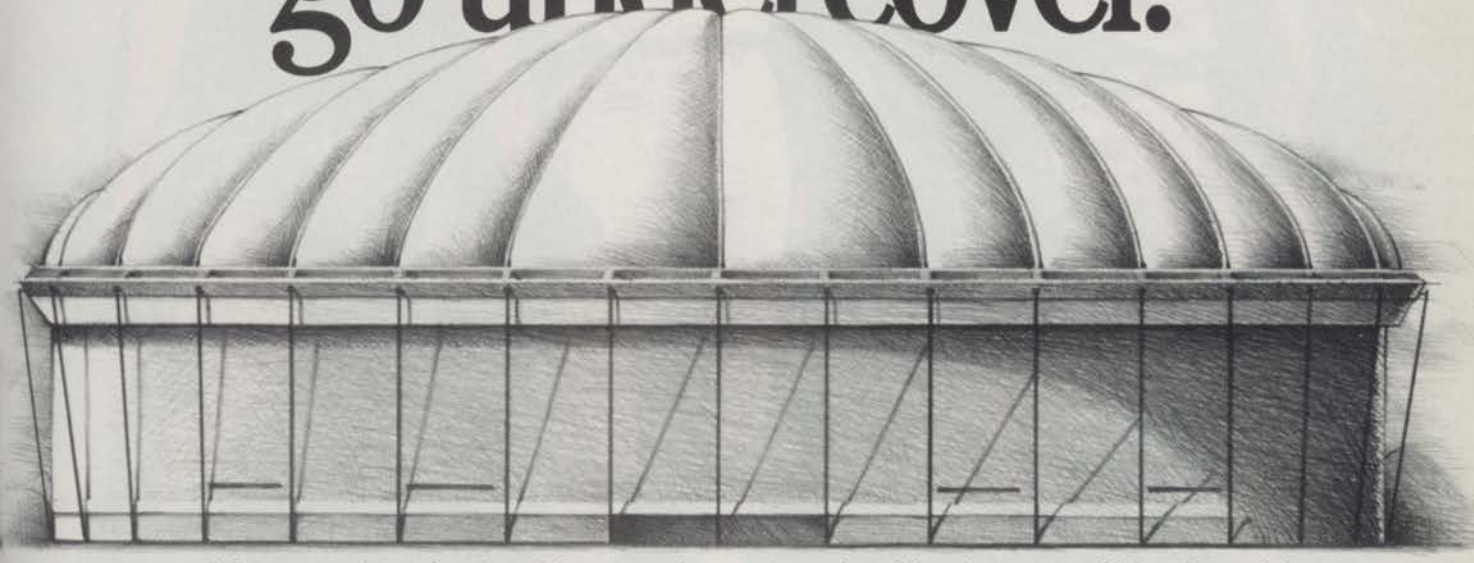
Although landscapers use Mirafi's products for drainage and soil reinforcement, the company has not concentrated on fabrics for weed control. Most of Mirafi's geotextiles are used by civil engineers.

Nonwoven fabrics are made through one of several processes. One process is spinbinding in which con-

Continued on page 58

A worker lines a trench with Warren's Terrabond before the gravel and pipe is put in place, thus preventing soil and gravel from mixing.

To find a grass tougher than our new Aspen Kentucky bluegrass, you'd have to go undercover.



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From the turf care group at Union Carbide

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Always read and follow instructions on the label.

Du Pont's Landscape Fabric is used to prevent weed growth around newly-planted shrubs.

tinuous fibers are spun onto a machine and are either glued together with resins, melted together with heat or chemicals, or mechanically needle-punched together.

Another nonwoven process is the staple method in which short fibers are bound together through one of the previously mentioned methods.

Companies will banter between themselves over which process is the best for a nonwoven fabrics.

For example, Du Pont's consumer literature states that nonwoven needle-punched materials are inferior because "under strain these loops tend to slip, resulting in a material that is not highly stretch-resistant."

It continues, saying that the thickness of needle-punched fabrics increases the possibility of soil getting into the fabric structure and reducing permeability. It can also retain water, resulting in buckling and cracking.

Reading that could convince just about anyone that heatbonded nonwoven fabrics are the way to go. But Warren's *Field Manual and Specification Guide* states that "heatbonding fibers causes indentation in the fiber, causing stress concentrations, resulting in lower tear and puncture strengths, as well as causing the fabric to be board-like, thus reducing the fabric's conformability significantly..."

The basic question, however, is whether woven or nonwoven is the best fabric overall.

'A double-knit suit'

Polyester products are never woven "unless you're talking about a double-knit suit," says Emory Hunter of Warren's, the leader in polyester fabrics.

Manufacturers of polypropylene products openly disagree over whether woven or nonwoven is better. Some companies even make both.

Jim DeWitt says the woven material is "far superior in suppressing weed growth."

The reason, he says, is because nonwoven fabrics are inconsistent in their make up, making it easier for weeds to find a way through.

"The woven fabric not only stops weeds, but allows sufficient air and water to get through for a healthier landscape," DeWitt says. "To prove that, we put out the Filterbond."

Filterbond takes a back seat to woven Weed Barrier.

American Woven Fabrics produces a woven fabric similar to DeWitt's Weed Barrier. Tom Lyons of American Woven Fabrics says woven fabrics are better because of the strength gained through the weaving of the materials.

What's the difference between the two fabrics?

Both companies say their product has more needle-punch.

So, who's telling the truth? Such claims are all part of the competition heating up in the industry.

Despite the argument over which process of creating a nonwoven material is best, nonwoven manufacturers do agree their products beat woven materials hands down. For one thing, the strength of woven materials is limited in two directions, length and width.

Du Pont's Landscape Fabric, introduced in 1984, appears to lead the market in retail use. Its Typar is used

FABRICS *from page 54*

primarily in the construction industry.

The Landscape Fabric is a lighter weight Typar. Dupont regional representative Rob Ebbets says spunbound fabrics allow water and air to pass through, without allowing weeds to break through. Woven fabrics, he points out, have much wider gaps for weeds to creep through the weave.

Nonwoven fabrics are lighter, so they cost less.

Nonwoven cost less

"Nonwovens can be cut to any shape," Ebbets says. "Wovens must be cut along the axis of the weave."

Tom Blunk says that Du Pont may lead per square yard in retail sales because of the lighter weight and, therefore, lower cost, but Blunk sells more to landscapers.

Duon's needle-punched surface helps mulch to stay in place on top of the fabric, Blunk says. Another advantage is that water passes through the material quicker than a smooth spunbound fabric.

"There's a high surface tension on the fibers," Ebbets explains. "But once you get it in the ground and dirty, water will flow right through it. In fact, it will flow faster than through soil."

A.C.F.'s Rit-a-Weed is available in three weights the light (2 oz.) and heavy (4 oz.) weight are nonwoven needle-punched polypropylene fabrics. The medium (3 oz.) weight is a woven needle-punched polypropylene product.

David Butler, A.C.F. branch manager, says the company markets both to stay competitive. "The woven has more tensile strength than the nonwoven for driveway applications," Butler says. "Since Blunk's has a nonwoven, we produce the heavy product to compete."

How is the competition? "We feel like we're selling just as much," Butler says.

Blunk says he hasn't seen Rit-A-Weed to compare it to Duon.

The competition doesn't stop there. Easy Gardener is making a dent with its Weedblock, the only molded nonwoven polypropylene.

"The advantage is uniform porosity," says Dick Grandy of Easy Gardner. "Every part of the fabric is the same."

The drawback of Weedblock is that it can't be used as a soil separater, as can many other products. Most landscape fabrics not only block weed growth, but can be used as a layer between gravel and soil in drains or under decks. Many also help stabilize the soil and slow erosion.

Frank J. McDonald, Director of Marketing
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"Most of the fabrics were not developed for use in landscaping," Grandy says. "Because we did, we have the advantage, but we can't be used effectively for soil separation."

Texas A&M University has been studying the use of Weedblock for five years. In that time, Grandy says, they've had to use a chemical only once, and that was for nutgrass. "They've saved an enormous amount of time and labor cost," he says.

The Polyesters

Warren's has little competition in the polyester market. Warren's products are made from Trevira, a registered name for the type of polyester used. Warren's markets three major products: Terrabond, used for weed control, soil or sand/gravel separation and erosion control; Terracover, used to cover and protect turf in sports complexes; and Terrashield, a blanket to cover greens and tees.

Terrabond and Terrashield are made of continuous spunbound fibers. Terracover is made with short staple fibers which create a tighter, denser fabric ideal for a stadium cover or bench tarp.

In fact, Steve Wightman of Denver's Mile High Stadium has successfully used Warren's geotextiles to protect the turf during rock concerts.

K.I.M. International produces Earthblanket, a Trevira polyester similar to Warren's Terrabond. It is marketed for home use, however, while Terrabond is primarily commercial. Earthblanket is light green in color.

Material color seems to be a real issue among polyester fabric manufacturers. Hunter emphasizes that Terrabond is gray, which won't cause snowblindness in a sandtrap, as might American Enka's white polyester Stabilenka.

Stabilenka is not a major competitor of Terrabond since it is usually used in conjunction with Enkamat for erosion control.

Bidim, made by the Quline Corp., is similar to Terrabond, and in fact shares the patent with Trevira.

Quline's Bobby Digh says the only difference is that "we play with the filament size and are slightly stronger."

Which is best?

Digh considers his biggest competitors the polypropylene products manufactured by major oil companies such as Amoco and Phillips.

Polyester, he says, has an advantage since it is chemical resistant and can be used to line places such as hazardous waste landfills. But most polypropylene manufacturers don't view polyester products as major competition yet.

Which geotextile is best to use depends on the application. Polyester works well as a ground cover, soil stabilizer or lining. Polypropylene will usually save some money, but its weight must be taken into consideration if it's being used for something other than weed control.

Which is the best for weed control? Every company has done its own tests or had a university run tests, but it seems there are no completed objective tests using all the materials on the market.

Perhaps Dupont's Ebbets best sums it up: "Nobody does tests on how they work to control weeds. Instead they play games with weights and fibers. People want to know if it works and if it does, how much does it cost, and can I trust it?"

If someone does such a test, please let us know. **WT&T**

A CRISIS SITUATION

Soil erosion is becoming a national crisis, particularly in the agricultural industry.

But farmers aren't alone in their concern for the loss of a natural resource, topsoil. Landscapers are also realizing the severity of the problem.

Geotextiles have become a popular solution. Not only do geotextiles control weeds, but they can slow erosion as well.

But the fabric has to be strong to stabilize the soil.

For example, DuPont's Landscape Fabric doesn't work as well as its heavier Typar. Varying strengths of Typar are used for erosion control in applications such as river and lake banks, coastlines, highway and railroad cuts, and ocean and bay shores.

Polyester products, such as Warren's Terrabond, are often used as a drain lining, soil/gravel separater, or for erosion control on banks.

But several companies specialize in products which control erosion. Many erosion-control materials also help seeds to germinate, creating a natural soil stabilizer with the root systems.

American Enka's Company's Enkamat is considered a geomatrix

Workers install Enkamat to prevent erosion of a pond's bank.

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GEOTEXTILES

Brand name	Circle No.	Manufacturer	Fabrication process
Bidim	101	Quline	nonwoven needle-punched spunbound polyester
Duon	102	Phillips	nonwoven staple fiber heatbonded needle-punched polypropylene
Earthblanket	103	K.I.M. International	nonwoven spunbound polyester
Filterbond	104	DeWitt (distributor)	nonwoven polypropylene
Landscape Fabric	105	Dupont	nonwoven continuous filament spunbound heatbonded polypropylene
Rit-a-Weed	106	Amoco	nonwoven and woven needle-punched polypropylene
Stabilenka	107	American Enka	nonwoven polyester
Terrabond	108	Warren's	nonwoven continuous filament needle-punched spunbound polyester
Terracover	109	Warren's	nonwoven staple fiber needle-punched spunbound polyester
Terrashield	110	Warren's	nonwoven continuous needle-punched spunbound polyester
Weed Barrier	111	DeWitt (distributor)	woven needle-punched polypropylene
Weed Barrier Mat	112	American Woven Fabrics	woven needle-punched polypropylene
Weedblock	113	Easy Gardener	nonwoven molded polypropylene

rather than a geotextile. Stabilenka, a polyester geotextile, is often used in conjunction with the Enkamat to further control erosion.

Enkamat is a three-dimensional structure made from heavy nylon monofilaments fused at their intersections. The open construction of the mat leaves 90 percent to be filled with soil, gravel or other materials.

It gives vegetation a matrix for vegetative root growth. Before vegetation develops, the Enkamat will protect against surface erosion and prevent the disturbance of seed distribution. After vegetation develops, the mat forms a surface cover skin which protects subsoils against erosive forces.

George Dodson, assistant development engineer for American Enka, says Enkamat is a permanant solution to an erosion problem. Dodson calls it "unique" and says it really doesn't have any competition, except for old-fashioned riprap.

Used alone, Enkamat can line highway ditches and storm channels. Used in a "sandwich" with Stabilenka, Enkamat can restore highway shoulders and slopes which have been damaged by acidic water, allowing turf to recover and grow. Dodson says Stabilenka can help prevent roadside weed growth, although the company doesn't market it for that purpose.

Barney Barron of the San Francisco Parks Department has used Enkamat since 1981 to hold down the sod in Candlestick Park. The root system established with Enkamat prevents individual grass plants from being uprooted by players cleats.

Dodson says landscapers often use Enkadrain (Stabilenka heatbonded to the Enkamat) to line terraces or planters instead of gravel.

Mirafy Inc. markets a similar product, Miramat, manufactured by 3M. Miramat is made of a vinyl material. Vice president of marketing Terry Montgomery says the difference between Miramat and Enkamat is that Miramat is heavier and more flexible. Another difference is that Miramat tends to be used more in the private sector, while Enkamat is used publicly, especially along highways.

While installing North American Green's erosion control blanket, one should start at the top of the slope and unroll the blanket. The blanket should never be stretched so that contact with the soil is constant.

Although Miramat was developed for civil engineering purposes, Montgomery says he has seen an increased interest among landscapers. "There's been a lot of interest," Montgomery says. "They use it to take care of unsightly areas, such as rock on slopes or channels or concrete lined ditches."

Miramat's green color adds to the natural look many landscapers are after, while controlling erosion at the same time.

Some companies have developed natural erosion control blankets made of biodegradable materials such as wood or straw. Montgomery doesn't consider the products competition.

"I think they're excellent in low-flow conditions. They serve a niche," Montgomery says. "We don't compete against mulch or straw. It's not cost-effective."

Natural products are much cheaper than the man-made Enkamat or Miramat.

Jim Neimeier, marketing director for North American Green, does consider the man-made products competition to his erosion control blankets made of straw, coconut fibers or a combination of both.

In fact, he has run tests comparing his blankets to the Enkamat, Miramat and other natural products, with his

continued on page 66

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DIAZINON.

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Turf Nit netting is stretched across a sod field to stabilize the seed while it germinates.

product winning in velocity and less soil loss. But the products are inherently different.

"We're flexible, they're more structural," Neimeier says. "Their product is permanent and doesn't provide an adequate environment for vegetation."

The blankets are constructed to prevent moisture loss through evaporation, while allowing water to get through. The blanket also keeps the soil warm to help seeds germinate.

"The key to stopping erosion is to revegetate the area," Neimeier explains. The blankets then break down and provide mulch to the area. The coconut fiber blankets last longer than the straw blankets, allowing strong root systems to develop.

Five of North American Green's six blankets are placed over a seeded area and stapled to the ground. The company has just developed a foot-operated staple gun for this purpose.

The sixth blanket comes preseeded, for steep grades. The company calls it "an effective alternative to sod."

The blanket is perhaps the only one of its type on the market. Quline Corporation has developed plans for a pre-seeded Bidim, which would be made in a biodegradable fabric and used on steep slopes where erosion is a serious problem.

The technology for erosion control blankets has long been used in Europe. "The U.S. is not as conscious of erosion because they have more land and less population," Neimeier says. "We're behind the times."

Erosion control blankets made out of wood were first developed by American Excelsior Co. about 25 years ago.

P.P.S. Packaging Co. manufactures the Xcel, excelsior erosion control blanket made out of Colorado Aspenwood. American Excelsior's Curlex blanket is made out of a type of poplar wood, similar to the Aspen.

Wood products last about one year to 18 months before biodegrading.

Houseman says he hasn't seen straw blankets used very often. "The basic difference is that Aspenwood has the highest moisture content and is able to absorb water. You don't want runoff," Houseman explains. "Straw isn't going to do that."

American Excelsior branch manager Ernesto Forti says another problem with straw it is often contaminated with weed seed. "It's hard to find sterilized straw," Forti says. The blanket is used most frequently along highways where weed growth is difficult to control anyway.

Houseman says his product isn't competitive with the man-made materials, estimating a price difference of 41 cents per square yard for the Xcel blanket to possibly $6 per square yard for the Enkamat or Miramat. Both Houseman and Forti agree that the two types of products can be used together to combat serious erosion problems.

The Department of Transportation is the biggest user of the wood blankets. Although Houseman says he's seen inroads in the landscape business, he says many people are still committed to jute mesh, a type of rope fabric imported from India.

Delmarva Textile Co. manufactures Turf Nit netting to prevent erosion on seeded areas. It works under the same theory as Curlex or North American Green products, except the person has to lay down the straw. Still, the extra labor may be worth it because of the cheaper cost.

Turf Nit is made of UV stabilized polypropylene fiber.

After an area is seeded and covered with straw, the netting holds the seed and straw down to prevent erosion while the seeds germinate. It also helps hold the root system in place.

Before Turf Nit, chemical tackifiers were used for the same purpose.

"There's nothing comparable," says Delmarva president Joe Lamb. "No one makes a knitted netting which won't blow away in wind conditions."

Turf Nit consumer information says it can withstand heavy rains and winds in excess of 50 mph. The product is available in two size rolls, a 630 lb., 7 1/2-acre roll for the sod industry and an easy-to-use 61 lb., 3/4-acre roll for the landscaping industry. The company even sells its own stakes to hold the netting in place.

According to Lamb, the smaller roll is becoming popular with golf courses which use it on small replacement sod fields. Some golf courses even use it to hold straw in place on heavy traffic areas.

"The erosion control business hasn't even started," Lamb says.

Whether its artificial and permanent like Enkamat or Miramat, biodegradable like Excel, Curlex, or American Green or an inexpensive alternative like Turf Nit, erosion control is a growing field...literally.

—Heide Aungst

FABRICS *from page 62*

GEOTEXTILE GLOSSARY

Here are important terms used in the geotextile manufacturing industry:

NONWOVEN: fabric made of a random orientation of fibers

WOVEN: all fibers in the fabric are oriented in two directions at right angles to each other

SPUNBOUND: nonwoven fabric using continuous filament fibers bound together with heat, chemicals, resin or needle-punch

STAPLE: nonwoven fabric using short fibers bound together with heat, chemicals, resin or needle-punch

POLYETHELENE: nonbreathable plastic film

POLYESTER: large, complex polymer derived from crude oil or natural gas that is resistant to many environmental fabrics

POLYPROPYLENE: short, less complex polymer derived from crude oil or natural gas

UV STABILIZED: fabric which has been treated to guard against breakdown from the sun's ultraviolet rays

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Kentucky bluegrass afflicted with rhizoctonia blight.

The fruiting structures of the pathogen of melanotus white patch.

THIRD OF THREE PARTS

CONTROLLING THE PATCH DISEASES

Warm weather and patch disease problems go hand-in-hand. Accurate diagnosis is a must for effective treatment.

by Dr. Houston Couch, Virginia Polytechnic Institute and State University

Editor's note: *Last month, Dr. Couch examined several summer patch diseases, including fusarium blight, sclerotium blight, and pythium blight. This month, he examines three other summer patch diseases—rhizoctonia blight, melanotus white patch, and summer patch. He describes key diagnostic features of each disease, listing specific weather and management conditions that favor development, and then gives control practices for each.*

Rhizoctonia blight

Rhizoctonia blight (brown patch) is incited by the fungus *Rhizoctonia solani*. This organism is pathogenic to over 1,800 plant species. Its grass hosts include all of the major warm season and cool season turfgrasses.

Rhizoctonia blight ranks as one of the most important diseases of turf and lawn grasses in the humid sections of the continental U.S.

In these areas, it is one of the more common diseases of bentgrass putting greens and bowling greens, and is often a cause of extensive blighting of Kentucky bluegrass lawns, athletic fields, and golf course fairways. In addition, from the Midwest to the Eastern seaboard, rhizoctonia blight is usually the most serious disease problem of tall fescue during July and August. During humid weather in the South, it can cause cause major damage to stands of zoysia and St. Augustinegrass.

The overall symptom patterns of rhizoctonia blight vary somewhat depending on the height of cut, the turfgrass type, and prevailing climatic conditions.

On bentgrass putting greens and bowling greens, its symptom pattern is characterized by irregularly-shaped patches of blighted grass ranging from a few inches to two feet in diameter. The coloration of these patches is usually first a purplish green, which rapidly fades to light brown as the leaves wither and dry out.

During warm, humid weather, dark, purplish "smoke rings," ½ to two inches in diameter, may border the diseased areas. These "halos" are usually more prominent in the early morning hours and may disappear as the day progresses.

On tall-cut grass maintained with grounds, golf course fairway, or home lawn management practices, the initial symptoms of rhizoctonia blight are irregularly blighted grass areas, ranging in size from a few inches to several feet in diameter. In the early development stages, the affected patches often develop as circular areas of dull tan to brown grass one to three feet in diameter with center areas of green, apparently unaffected plants—thus producing a "frog-eye" pattern.

The individual leaf symptoms of rhizoctonia blight on tall-cut grass are distinctive. They first appear as small, dull tan lesions. As they enlarge, they develop reddish-brown margins. Individual lesions may expand to envelop large sections of the leaf.

When this happens, in contrast to the symptoms of pythium blight, the integrity of the affected leaf tissue remains intact. In other words, instead of becoming softened, twisted, and matted together as in the case of pythium blight, leaves affected by rhizoctonia blight tend to retain their original shape and take on a dull tan to light brown, "dried out" appearance.

The infection of turfgrass leaves by *Rhizoctonia solani* begins when air

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Melanotus white patch is more severe on young tall fescue.

temperatures reach the low 70s (degrees F). When the daily air temperatures move into the mid 80s, infection rates increase significantly and the extent of colonization of the leaves by the invading fungus becomes more pronounced.

Free water on the surface of the leaves is an important factor in producing maximum infections. When the air temperatures are in the low-to-mid 70s, continuous leaf wetting for a period of 36-48 hours is necessary in order for a high order of infections to occur.

Dr. Houston Couch is professor of plant pathology in the Dept. of Plant Pathology, Physiology, and Weed Science at the Virginia Polytechnic Institute and State University in Blacksburg, Va.

However, when the air temperatures are in the mid to high 80s, a high incidence of infections can occur within eight to 12 hours. The severity of rhizoctonia blight is much greater on grass grown under high nitrogen fertilization.

Soil moisture stress in the readily available range (field capacity to permanent wilting percentage) does not affect disease development. Market-available fungicides labeled for rhizoctonia blight control include Actidione Thiram, Chipco 26019, and Daconil 2787.

In areas where outbreaks are a recurring problem, a preventive spray program is necessary if consistent control of the disease is to be accomplished.

As a general rule, the initial fungicide application should be made immediately after the first night where air temperatures do not drop below 70 degrees F.

Melanotus white patch

Melanotus white patch is caused by the fungus *Melanotus phillipsii*. To date, the disease has been observed only on tall fescue.

Outbreaks of white patch have been reported in Virginia, Georgia, North Carolina, Kentucky, Tennessee, and Alabama. However, it is highly probable that this disease is more widespread but has not yet been identified in other areas.

In the early stages of development, melanotus white patch is seen as circular patches of blighted turfgrass three to five inches in diameter but may enlarge to eight to 14 inches. These initial sites of disease development often coalesce to involve large areas of turfgrass.

In overall view, these affected areas have a distinctive off-white color. Also, the individual patches may be surrounded by a salmon-pink border. The grass leaves within the patches may mat together and become closely pressed to the soil surface.

The disease is restricted to the leaf blades, with the crowns of the plants unaffected. This means that with the return of cooler growing temperatures, total recovery of the affected plants usually occurs.

Beginning first at the tip and then progressing downward toward the sheath, the individual grass leaves assume a light tan to bleached white color. Both the mycelium and the fruiting bodies of the causal fungus occur commonly on the surfaces of the affected leaves. The mycelium is seen as a grayish-white cobwebby growth on the leaves.

The fruiting structures are very distinctive and therefore, serve as a valuable aid in diagnosis. These are small grayish- white mushroom-like bodies, $^{1}/_{16}$-to-$^{5}/_{16}$ inch in diameter. They develop initially as small round balls. Eventually, they open and the familiar gills found on mushrooms are apparent on their lower sides.

Melanotus white patch is more severe on tall fescue stands that are less than a year old. Also, heavily seeded grass is usually more severely affected by the disease than grass seeded at a normal rate.

The development of white patch is favored by hot, humid weather. Damage from the disease is greatest when the daytime air temperatures exceed 85 degrees F and the night temperatures do not fall below 70.

In a given stand of grass, the most severe level of disease development occurs in the areas exposed to full sunlight rather than shaded areas.

Outbreaks of white patch are heaviest under conditions of low soil moisture content. In field trials, commercially available fungicides have failed to control melanotus white patch.

Certain cultural practices are helpful, however, in reducing disease severity. Since white patch is favored by hot, dry weather conditions, watering the stand of grass during these times to promote adequate plant growth will alleviate the problem to some extent.

In addition, while establishing new stands of grass, or when overseeding with tall fescue, one should take care to stay within the recommended seeding rate.

A POSITION STATEMENT ON REGULATORY ACTION RELATING TO THE USE OF D-Z-N® DIAZINON

Recent regulatory action by the Environmental Protection Agency (EPA) has made it necessary for CIBA-GEIGY to make clear its position on the use of diazinon on golf courses and sod farms.

The EPA has proposed that diazinon no longer be used on golf courses and sod farms because the product may present undue hazards to birds, particularly waterfowl.

CIBA-GEIGY's Position

1. We believe that—with proper precautions and use practices—diazinon can be used on golf courses and sod farms without undue hazard to birds.

2. We have submitted a rebuttal to the EPA's proposal and are defending our current registrations of the product. Soon we will have an opportunity to present data on diazinon to the Agency's Scientific Advisory Panel.

3. We are actively encouraging you, the turfgrass industry, to continue working to reduce potential hazards. In working with the Cooperative Extension Service at Cornell University, we have compiled several recommendations that help you significantly reduce potential hazards to birds when using D-z-n to control insects on golf courses and sod farms. To receive a copy, write to the following address:

D-z-n Diazinon Recommendations
CIBA-GEIGY Corporation
Agricultural Division
P.O. Box 18300
Greensboro, NC 27419

CIBA-GEIGY believes that the Agency will conclude that our data and recommendations support the continued use of diazinon on golf courses and sod farms. A final ruling on the EPA's proposal will probably not be made for several months.

CIBA-GEIGY

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Circle No. 110 on Reader Inquiry Card

Summer Patch

To date, a dying-out of turfgrass referred to as "summer patch" has been reported on Kentucky bluegrass in New York. It also has been suggested that a similar disease pattern may be occurring in other northeastern states and in certain midwest states.

Outbreaks of summer patch reportedly develop in July and August during prolonged periods of hot weather. The symptoms reported include irregular patches of dull tan to brown grass. The individual areas may be more or less circular in outline and extend up to several feet in diameter.

Within the diseased stand of grass, there may be areas that show the basic frog-eye pattern of patches of blighted grass with center tufts of apparently healthy plants. Recent research at Cornell University indicates that the summer patch condition may be brought on by periods of temperature stress combined with close mowing or other management-induced stresses, and then the colonization of the weakened plants by the fungus *Phialophora graminicola*.

Rhizoctonia blight ranks as one of the most important diseases of turf and lawn grasses in the humid sections of the continental U.S.

This particular fungus species is commonly found in association with the root systems of grasses. Its potential for affecting the health of grass plants has been the subject of considerable research by plant pathologists in England.

English research has demonstrated that *Phialophora graminicola* is a very weak plant pathogen. Furthermore, it has been found that when this fungus is placed in the soil, not only does it not harm the turfgrass, but it protects the plants from infection by the take-all pathogen *Gaeumannomyces graminis*.

Also, when the soil of stands of fescue and bentgrass is infested with *Phialophora graminicola*, the growth rates of the plants increase significantly, perhaps due to the fact that the fungus enhances nutrient uptake by the root systems.

The inoculation techniques that have been used in the Cornell pathogenicity tests with *Phialophora graminicola* have involved growing conditions that placed the plants under extreme stress.

For example, one set of experiments was conducted on seven-year-old Kentucky bluegrass field-grown sod cut at a depth of 3/4-inch and then placed over a 3/8-inch layer of soil in plastic containers.

These plants were then held in growth chambers under a continuous day-night air temperature of 85 degrees F for 15 weeks. Under these conditions, the mortality rate among the test plants was high.

These various research findings place summer patch in the category of symptoms known as senescence syndromes.

The symptom patterns in this grouping are caused by a combination of acute plant stress from weather and/or management practices followed by colonization of the weakened plant tissue by various micro-organisms. Examples of other senescence syndrome patterns in turfgrasses are Curvularia blight and anthracnose.

The senescence syndromes sometimes place the diagnostician in a dilemma. For the question that must be answered is whether or not the invading fungi or bacteria are actually compounding the stress-induced problem by introducing an added measure of tissue degradation, or if the initial environmental pressure was severe enough in itself to lead to the ultimate death of the affected leaf, crown, or root system.

If the micro-organisms that are found in the diseased plant are indeed compounding the stress-induced phase of the problem by introducing an added measure of tissue breakdown, then the use of a pesticide might be in order.

However, if the initial stress that has been placed on the plant is severe enough in its own right to bring about death, then the establishment of a spray program to control the micro-organisms would be a waste of time and money.

Much more field and laboratory research is needed before the cause and nature of the condition being referred to as "summer patch" is adequately understood and a positive determination can be made as to whether the use of fungicides to control the disease is feasable.

In the meantime, in situations where it has been decided that the problem at hand is summer patch, the best advice on fungicidal control that can be given is that if these attempts are made, one should keep the expectations for their success to a minimum. **WT&T**

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LEASING VS. BUYING

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by Rudd McGary and Ed Wandtke

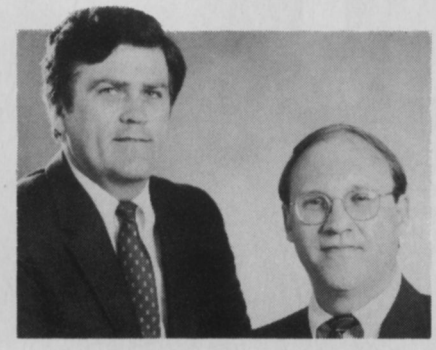
The decision whether to lease or buy equipment for most landscape managers is requiring more complex analysis. The evaluation can be quantitative but in the end, it's a case of choosing the "best fit."

For the proper analysis, you need to take into consideration the goals of your company, the effects of the Statement of Financial Accounting Standards No. 13 on the balance sheet and the income statement (this is available from the American Institute of Certified Public Accountants), the impact of any decision on the cash flow requirements of the firm, and income taxes.

Leasing dates back to 1400 B.C. when the Greeks introduced maritime leases. Leasing today offers flexibilities not even considered then but which can be especially beneficial to a modern business. Leasing as a form of financial leveraging allows otherwise under-financed firms to obtain the needed capital to continue expanding their business.

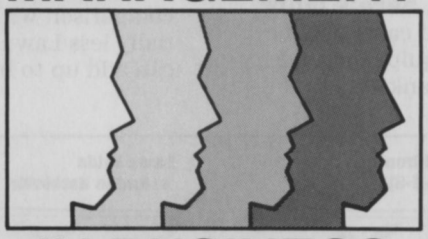
Four types of leases are offered today: capital leases, leveraged leases, financial leases, and operating leases. One will be appropriate, depending on the equipment or vehicles being financed.

With the capital lease, nearly all the benefits and risks of ownership of the asset are transferred to the lessee.



Wandtke and McGary are senior consultants with All-Green Management Associates in Columbus, Ohio. McGary focuses on marketing and management issues. Wandtke focuses on operations and financial questions.

MANAGEMENT



IN BUSINESS

The Accounting Standards Board requires the asset and liability to be recorded on a firm's balance sheet.

The leveraged lease's principal attraction is the ability to secure financing from various sources to fund the acquisition of complex technologies involving $1 million or more.

A financial lease provides the lessors an opportunity to transfer all their rights to the lessee for a fixed period of time (less than the economic life of the assets leased).

Operating leases allow the lessor to retain title, benefits, rights and the equipment that is being leased without the risk of owning the equipment.

The following will focus on leasing in general. It will not isolate specific risks, pitfalls or opportunities in using one of the types of leases mentioned above.

Leasing

Some of the advantages of leasing are:

1. Low costs can be passed on to the lessee because the lease's tax benefits are being retained by the lessor. In many instances, the lessee can not use the accelerated tax depreciation and tax credits available through purchasing.

2. Loan payments, though equal to lease payments over the life of the lease, are usually higher than early lease payments.

3. A lease can be structured to accommodate a lessee's desire to either have the lease "on" or "off" the accounting books (balance sheet).

4. Leases can provide financing for a company which may be otherwise restricted from incurring debt because of loan covenants.

5. Having fixed-lease monthly payments may be a hedge against inflation.

6. If technology changes, as seen with computers and telephone systems, you frequently are allowed to upgrade your equipment by breaking your current lease and signing a new one.

7. Funds will be available to pursue other business options or requirements.

Some of the disadvantages of leasing are:

1. Initial flexibility of a lease may prove to be only illusionary if noncancelable features are invoked when a piece of equipment becomes obsolete or expensive to maintain.

2. A lease may include a maintenance agreement on the equipment at a premium price when the maintenance could be done cheaper in-house.

3. You may pay a considerable premium for a lease when you add equipment to a lease that has a different useful life than the prime leased equipment. Example: tanks placed on a manufacturer's chasis.

Quantitative evaluation of the lease options comfronting most of us require that you also look at the implications of TEFRA 1982, ERTA 1981, SFAS No. 13, your firm's financial position.

Beware of the salesman who promotes leasing as a way to defer expenditure of capital. He is really saying you are deferring the expenditure of cash. Another line we just heard was that a tax timing advantage would result from leasing. When we reviewed the numbers he was correct, but the advantage went to purchasing.

Purchasing

There are several advantages to purchasing that must be evaluated before making the lease/buy decision.

The larger your firm, the more leverage you will have to choose purchasing instead of leasing. In addition, firms which have surplus cash, high liquidity, and use low technology assets should investigate buying.

Some of the advantages of pur-

chasing are:

1. Preferred interest rate from the financial institution that is helping you expand your business.

2. Investment tax credits are available to a purchaser but not available to a lessor except with a price increase in the lease.

3. Higher level of control over vendors who will deal with you.

4. Benefit of the ACRS tax advantages are available only to ownership.

After evaluating the above options of leasing versus buying, you will need to prepare a financial analysis of the options under consideration. Make sure that you compare apples to apples; all too often we see people comparing dissimilar features, such as the before-tax cost of purchasing and the after-tax cost of leasing. Use financial advisors to assist you in making this analysis, since the benefits in cost savings, improved flexibility, and profitability will be worth the additional input.

For the more adventuresome, computer programs are available for use on IBM and similar compatible hardware.

The analysis

The analysis should look at the net present value of the cash flow between the two options; the net present value of the monies to be expended; tax benefits of the options; depreciation benefits of purchasing; impact of the present low interest rates; and return on investments your firm is making on its equity.

Even though leasing of equipment continues to grow, purchasing continues to be the principle means of acquisition.

The following list of information is needed to do a net present value analysis:

1. Initial outlay (out-of-pocket costs) to acquire the asset net of any adjustment for investment tax credit.

2. Funds from the old asset's disposal, if any.

3. Tax effect of the gain or loss from selling the old asset.

4. Projected recovery from the disposal of this asset at the end of its useful life.

5. Annual revenue to be generated from acquiring this asset.

6. Annual costs of operating and maintaining this equipment.

7. Tax benefit from deducting total lease payment on tax return.

8. ACRS depreciation benefits of owning the asset.

9. Depreciation tax shield on disposal of the old asset.

While this list of information may look complex at first, once you begin to work with and understand the benefits of the analysis you will find the information necessary to make an intelligent decision.

Even though leasing of equipment continues to grow, purchasing continues to be the principle means of acquisition. Any company with liquidity, the ability to secure its own financing, or can use more tax benefits should consider buying over leasing.

Even though you may have found making a decision between buying or leasing is still confusing, your decision will ultimately be made on the basis of tax benefits and the ability to sustain the cash flow required. **WT&T**

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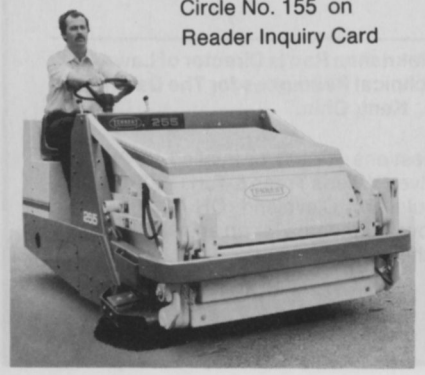

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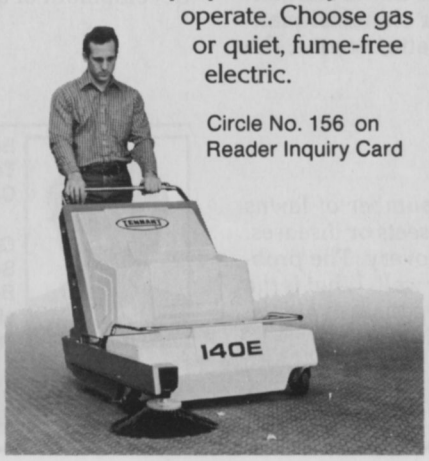

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PROBLEM SOLVERS

by **Balakrishna Rao**, Ph.D

Treating dogwood trees

Problem: *We have seen dogwood trees with swellings on the tips of the twigs. Affected twigs look stunted and the portion above the swellings will be killed. What causes these and what can be done to manage this problem? (Tennessee)*

Solution: From your description of the problem and symptoms, I feel that the swellings on the dogwood twigs are dogwood club galls, caused by a small reddish-brown fly, *Mycodiplosis alternata*.

In May the female fly lays eggs on young shoots near the terminal bud. The larvae hatch from the eggs, bore into the twig and cause swellings which are noticeable in a month or so.

Larvae grow inside the club galls and then drop to the ground by September to overwinter. The following May, the adult flies will emerge and repeat the life cycle.

If the problem is not very severe, simply prune the galls before August 1 and destroy them to minimize the problem. Galls can be prevented by applying insecticides like Sevin or lindane to the branches between May 1 and June 15. During this time frame, several applications may be necessary to obtain maximum protection. From the time mature larvae drop to the ground, around August 15 till September 15, they can be controlled by the application of insecticides on the ground.

Contact your local cooperative extension agents for the choice of insecticides to use.

Galls: an unknown

Problem: *We have seen a number of sugar maples with large galls on the branches. What causes these and will they kill the trees? Is there something that can be done to prevent or cure these? (Ohio)*

Solution: We have seen these large tumorous growths on the trunk and branches of red and sugar maple trees. Galls have been attributed to Phomopsis, a fungal agent. Very little is known at the present time about this disease. Often infected plants may produce several galls; however, the disease apparently does not spread easily from one tree to another.

There is no recommendation for chemical management of the problem. For aesthetic reasons, the galls can be pruned and removed.

Solving poor rooting

Problem: *Last year we repaired a number of lawns which were severely damaged by insects or diseases. We used sod as a means for fast recovery. The problem is that the sod is not rooting very well. What is the problem? What can we do now? How can we avoid the problem in the future? (Pennsylvania)*

Solution: Poor rooting of newly sodded turfgrass may be due to several factors such as lack of sufficient moisture, interface, and improper soil preparation at planting.

After sod installation, one must provide sufficient moisture during establishment. During high temperature periods, improperly sealed sod edges can lose excessive moisture. In addition, most sod is grown on muck soils and interface problems can arise when it is placed on clay-type soil without good soil preparation. The difference in soil type leads to incompatibility, resulting in poor penetration and surface runoff whenever watered. This affects proper rooting.

Prior to sod installation, the soil should be tilled and prepared for sod installation. At this time it is easy to incorporate phosphorus, a needed element for root development.

In the same way, any pH correction can be accomplished at this time. In the future make sure that the endrothrips soil is prepared properly for root penetration, and sufficient moisture is provided during the establishment period. The areas showing poor rooting can be helped by core aerifying in fall or early spring. If possible, aerify annually to hasten results.

Football fields, fertilizer, and lime

Problem: *When trying to improve turf on football practice fields, can you use fertilizer or lime? How about adding round sand before coring to help increase rooting zone? (Ohio)*

Solution: Based on soil test results, fertilizer and lime can be used as needed when trying to improve turf on football practice fields. Adding sand before coring is not be as beneficial as adding it after coring. By adding sand after coring, there is a greater chance for the sand particles to fall into the aerification holes. This is the preferred method.

Reports suggest that addition of medium to coarse sand (ranging from 0.25 to 1.2 mm in diameter) is useful to reduce compaction and increase root depth. Continued use of sand could lead to layering or the development of an interface.

Balakrishna Rao is Director of Lawn Care Technical Resources for The Davey Tree Co., Kent, Ohio.

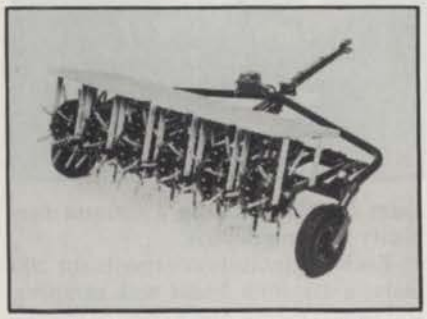
Questions should be mailed to Problem Solver, Weeds Trees & Turf, 7500 Old Oak Boulevard, Cleveland, OH 44130. Please allow 2-3 months for an answer to appear in the magazine.

Tractor-drawn units aerate large areas

Two tractor-drawn aerators from Ryan offer a solution for aerating large turf areas like parks, athletic fields and fairways.

Designed principally for large, flat areas, the Tracaire can be used with coring, slicing or open spoon tines, which leave a coring pattern of 6x6 inches penetrating up to four inches deep. The Tracaire can be mounted on tractors with a category one 3-point hitch with 1,000-lb. lift capacity.

For rolling uneven turf areas, the Renovaire features independently-



mounted tine wheel pairs that follow surface contours. Each pair of wheels also has a weight tray that holds up to 150 lbs. for more downward pressure. The Renovaire can also be equipped with coring, slicing or open spoon tines.

Circle No. 190 on Reader Inquiry Card

Three herbicides added to industry's arsenal

The Specialty Products Group of Union Carbide Agricultural Products Co. has added three professional-use products: Weedone Ready-To-Use (RTU) brush and vine killer, Weedone Super D Pro amine herbicide, and

Zectran 2E mexacarbate pesticide.

RTU is designed for controlling unwanted bushes, trees and vines around buildings, roughs, fences, rights-of-way, and other non-crop locations.

Super D Pro provides broadleaf weed control in ornamental turf areas such as golf courses and athletic fields.

Zectran 2E controls snails, slugs, aphids, and scales on ornamentals, flowers, shrubs, vines, trees, and turf.

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Ford doubles its commercial mower line

Three new commercial lawn mowers double Ford Tractor's selection. The models are the C38 Intermediate, the

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C24 High Wheel push-type and the C24SP High Wheel self-propelled.

The C38 has an 11 hp Briggs & Stratton four-cycle industrial/commercial engine with a five-speed heavy duty transaxle. It has a 38-inch full floating deck with anti-scalp rollers and skid bars.

The C24 and C24SP mowers both have 24-inch decks. They have 5 hp Briggs & Stratton industrial/commercial engines and are designed for rough, irregular terrain, slopes or sandy soil where smaller wheels are less effective.

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Circle No. 124 on Reader Inquiry Card

Portable lab for evaluating soils

LaMotte Chemical has introduced a test kit for on-site evaluations of turfgrass soils called the Turf Lab Model TL-1.

An improved colorimetric test method is used to achieve quantitative pH and phosphorus measurements. Using an Octa-Slide comparator, permanent translucent color standards are compared to clear liquid test samples for more accurate readings. The Turf Lab checks potassium levels by using a unique turbidity reading device.

Each kit includes reagents for 200 tests, a six-inch brass soil sampler, soil report forms, and a copy of the 60-page LaMotte Soil Handbook. All components fit into a rugged carrying case for dependable use in the field or lab.

Circle No. 193 on Reader Inquiry Card

Chipco fungicide gets EPA approval

The EPA has given label approval to Chipco Aliette fungicide, a Rhone-Poulenc product.

The fungicide, which controls turfgrass pythium blight, features a systematic mode of action which pro-

vides both upward and downward movement within the plan. Chipco Aliette is applied as a foliar spray.

Application calls for 4-8 ounces per 1000 sq. ft. at an interval of 14 to 21 days. Watering is not required following an application.

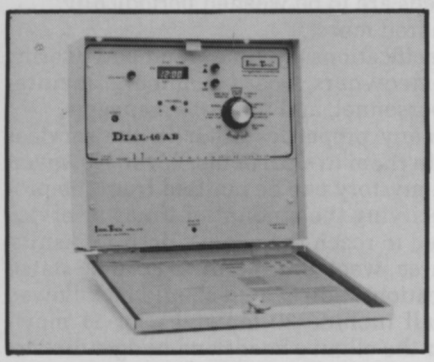
Circle No. 194 on Reader Inquiry Card

Single-dial controller is for residential use

Irri-Trol Mfg. has introduced a new single-dial residential controller. The new Dial AB features solid-state logic and split-second reliability.

The controller has a 12-position function dial and bright fluorescent display.

Also featured is sequential station



watering, a selectable 6- or 14-day clock, and an automatic safety back-up program. No keyboard is required for setting the controller.

The Dial AB is available in 5-, 7-, 11-, 14- and 16-station models.

Circle No. 195 on Reader Inquiry Card

Many mower lines available from Alamo

Rotary, flail, and sicklebar mowers previously marketed individually by

Terrain King, Mott, and Triumph are now sold nationwide by the Alamo Group, Seguin, Texas.

Alamo has a brochure detailing all available mowers, featuring the Mott Interstater, Terrain King Versa series, Triumph Hydro-Clipper, and others. Alamo says all are designed to solve specific maintenance problems encountered by people responsible for maintaining highway rights-of-way, airports, parks, and other public lands.

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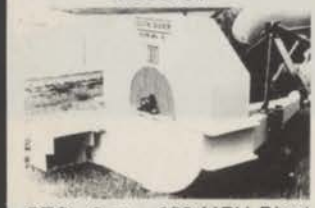

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LETTERS

Ambiguous contracts

To the editor:

For 14 years, my company has specialized in providing complete lawn maintenance service for townhome and condominium homeowner associations. We currently maintain over 7,000 units at more than 30 locations with gross sales of over $1 million.

Over the years, I have been asked to bid on many properties—from the quite exclusive to the moderate—and usually the contract specifications were not well-defined.

They were unclear to both the contractor and homeowner.

The following are some of my favorite unclear quotes:

- "...cultivating of trees and shrubs shall be done *as needed* but not less than two times."
- "...sidewalks and curbs will be edged *as required*."
- "...all turf areas shall be mowed *approximately* once per week."
- "...all shrub beds are to be weeded *periodically*."

There are a hundred more!

The contract specifications are unfair and bewildering to contractors, homeowners, board members, maintenance committee personnel, and property managers.

It is true that many properties differ in the services required to maintain them to a particular level. However, the guesswork and mystery can be omitted from the process by simply specifying the amount of times a service should be performed to reach the client's desired results.

In the Chicago area, weekly turf mowing can be stated in the lawn specifications; however, it should be followed with, "this bid shall include 20 mowings...or 21 mowings..." or whatever the client's needs and budget dictate. This takes the guesswork out of estimating and clearly states what the customer can expect.

If the client desires to have superbly-conditioned turf, twice-a-week mowing would be necessary during certain weeks. The amount of mowings would change to 26...or 27...or 28, and this should be made clear in the contract specifications and stated precisely in the bid.

By simply specifying the precise frequency of a service, the property manager, homeowner, and contractor can work together to reach a desired level of maintenance that could fit into a desired budget.

Michael Cavaliere
Best Lawns
Addison, Ill.

Taking the first step with pesticides

To the editor:

Your editorial in the March issue did a great job in alerting your readership to future problems with the EPA. They (EPA) are just now getting around to taking a look at non-food crops.

As an old hand in the ag chemicals business and being on the receiving end of their regulations since the day the agency was born, I can offer this gem of advice: you can expect to see a lot more EPA involvement in non-crop areas.

You have many counterparts in the ag business whose experience you could draw on, and who would welcome you as an ally. But you are already taking the important first step, and that is trying to get your readers to involve themselves in defending their "turf" (pun intended).

Your work is cut out for you, because most people will not even write their congressman, much less give a short speech at a local garden club, Kiwanis or Rotary meeting.

The unfortunate thing about this is that these local folks talking to neighbors and congressmen can do more to create positive public attitudes than all the lobbyists put together.

I started about three years ago to offer myself as speaker to any group in south Georgia that wanted to hear the industry side of pesticides. I have found this to be most rewarding (though not monetarily). Most audiences know very little about the ag business and are delighted to hear about it. I end up enjoying these sessions as much as, or more than, the audience.

I really hope that you keep the pressure on your guys to talk to their local clubs and congressmen. It will pay off handsomely.

Robert E. Gartman
Tifton, Ga.

Natural turf in domed stadiums?

To the editor:

I am a reader. It's great to be loved. Sports turf will be in the public eye for many moons. The National Sports Turf Council will be covering all the bases, exerting influence to improve the quality of all playing surfaces.

Natural turf in domed stadiums is intriguing, and it will come to reality at a high but justifiable cost. While that development is taking place, there will be a widespread concerted effort to develop safer sports turf on many thousands of high school athletic fields. Domed stadiums may capture headlines, but the moms and pops will identify with those who help to prevent injuries to their children.

"No injuries in four years." A high school field in Ohio and one in Pennsylvania document this claim. The "mentor" in Ohio was a golf course superintendent. An ex-county extension agent masterminded the one in Pennsylvania. No headlines on these so far. Too insignificant to attract attention? The involved parents are delighted! So are the kids, the coaches and trainers!

NSTC wants to spread the benefits of safer sports turf evenly across the board.

Fred V. Grau
Chairman/NSTC
College Park, Md.

Yes, Environmental Industries No. 1

To the editor:

Thank you for honoring us by including Brickman in your article listing "Landscaping's Elite."

I need, however, to correct an error arising from any impression you may have gotten from me regarding the relative ranking of Brickman and Environmental Industries.

The fact that they produce revenues three to four times that of Brickman Group makes the statement quoted to me that "they may have beaten us overall" misleading.

Like many firms which look up to Brickman for the successes which we are fortunate to enjoy, we look up to Environmental Industries as the recognized leader in our industry.

I applaud WEEDS TREES & TURF for its efforts in surveying the industry and providing much-needed information to the consumer. I might suggest, however, that it would be prudent to research information on firms listed but not supplying information for your articles by such means as Dun & Bradstreet listings.

Once again, thank you for your efforts toward enlightening our industry.

Bruce A. Hunt
Brickman Industries
Laurel, Md.

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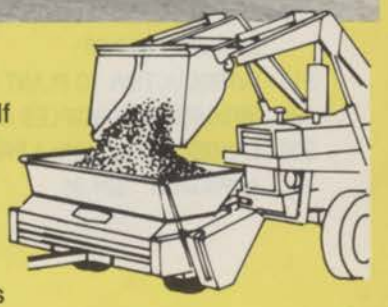

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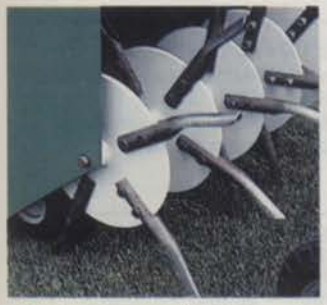

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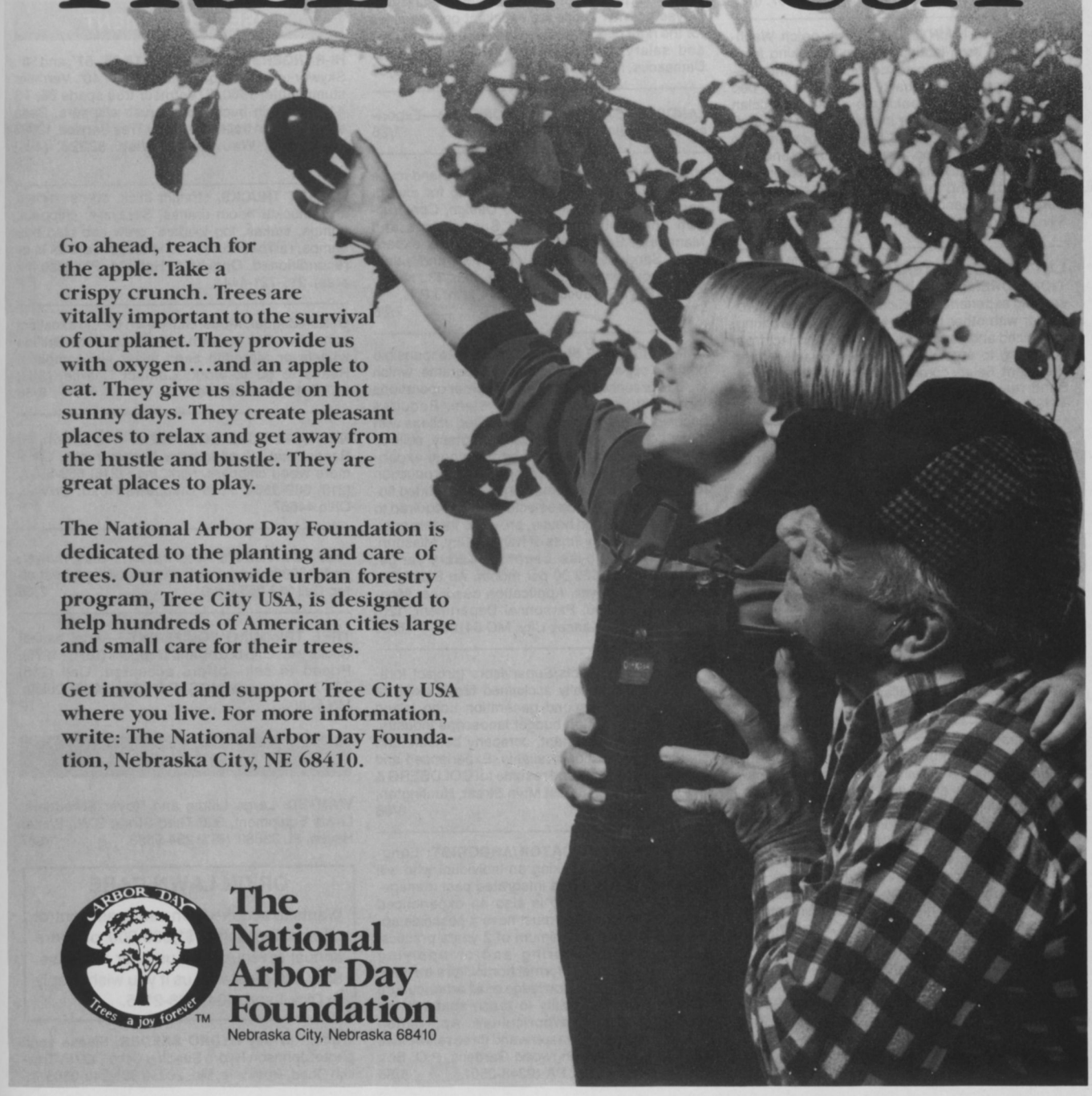

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AD INDEX

NO.	ADVERTISER	PAGE
101	American Cyanamid	16-17
	Andersons, The (reg.)	18-19
	Andersons, The (reg.)	72-73
104	Aquatrols Corp. of America	13
105	B.A.S.F. Corporation	27
106	Brouwer Turf Equip.	CV3
107	Bunton Company	39
221	Chevron Chemical Co.	41
250	Ciba-Geigy Corp.	64-65
110	Ciba-Geigy Corp.	71
111	Club Car, Inc.	20
112	Cushman Ryan	21
113	Cushman Frontline	59
114	John Deere & Co.	4-5
115	Elanco Products/Rubigan	61
116	Elanco Products/Surflan Ind.	37
262	Elanco Products/Surflan Orn.	1
118	Excel Industries	63
119	E-Z-Go/Textron	CV2
120	Great Plains Industries	80
121	Hoffco Inc.	12
122	Howard Price Turf Equip.	29
123	Int'l Society of Arborculture	79
124	Lawn Garden & Power Expo	78
125	Jacklin Seed Co.	77
126	Jacobsen/Div. of Textron	67
127	Lebanon Chemical Corp.	46
251	Lesco Inc.	7
129	Lesco Inc.	85
229	Lofts Inc.	CV4
161	Melroe Company	89
131	Mobay Chemical/ Bayleton	69
132	Mobay Chemical/ Bayleton	24-25
	Mobay Chemical/Nemacur (reg.)	91
134	Mobay Chemical/ Oftanol	33
135	Mobay Chemical/ Oftanol	33
	Mobay Chemical/Sencor (reg.)	87
137	Monsanto Agri. Products	53
138	Monsanto Agri. Products (reg.)	46A-H
139	Nor-Am Chemical Co.	34-35
158	Northrup King	55
140	Olathe Mfg. Co.	18
141	Olathe Mfg. Co.	80
142	PBI/Gordon Corp.	44-45
162	PBI/Gordon	44-45
160	Pickseed West Inc.	43
143	Promark Products Inc.	14
144	RainBird Corp.	3
145	Solo, Inc.	90
146	Southern Mill Creek	15
147	Tee-2-Green	51
148	Teledyne Total Power	28
155	Tennant Co.	75
150	Toro Irrigation	31
151	Turfco Mfg. Inc.	81
152	Turf Vac	52
153	Union Carbide Corp.	56-57
154	Zoecon	49

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This 'association' is important

Another association? Come on, there's already too many in the green industry. Probably true. But this is not your average association. It's not even an association, it's a *council*.

The National Sports Turf Council (NSTC) recently held its third organizational meeting in Beltsville, Md., to talk about what it will become in the very near future. The names of the people involved read like a sports turf all-star roster: Drs. Fred Grau, Jack Murray, Don Waddington, Jim Watson, Henry Indyk, Tom Turner, Dave Chalmers, Eliot Roberts, and Kent Kurtz. A few other luminaries were unable to attend.

The group is serious. A search for an executive director is on. Beltsville was chosen as at least temporary home for the group until the ball begins rolling.

An educational assistance proposal was devised, and directors (the above names) developed a membership/sponsorship program. Research ranks high on the directors' priority list. Other pertinent items were discussed, such as what is the relationship of the NSTC to other groups, like the Sports Turf Managers Association (STMA).

Dr. Grau said the NSTC will act as an umbrella organization, seeking the support of industry associations and suppliers. "There will no semblance of conflict or competition between organizations," said Dr. Grau.

Dr. Grau and other directors were quick to note that there's still much to be done, but the framework is slowly taking form. And that's great news for the sports turf industry, from the major league field manager to the one-man crew in Iowa that tends the local Little League field.

NSTC, under the wing of the Musser Foundation, will soon be available to assist all those involved with sports turf.

No doubt this most vital organization will knock at your door in the near future. Take the time to listen. It's not just another association.

Ken Kuhajda

Ken Kuhajda, managing editor

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Gator	5.9	Cowboy	5.4
Prelude	5.8	Dasher	5.4
Tara	5.8	Diplomat	5.3
Repell	5.7	Ovation	5.3
Citation II	5.7	Pennfine	5.3
Manhattan II	5.7	Regal	5.3
Premier	5.7	Delray	5.2
All Star	5.6	Barry	5.2
Blazer	5.6	Omega	5.2
Ranger	5.6	Elka	5.2
Birdie II	5.6	Manhattan	5.1
Fiesta	5.5	Citation	3.6
Yorktown II	5.5	Linn	
Pennant	5.5		

Test locations: Kingston, RI; Ithaca & Riverhead, NY; North Brunswick & Adelphia, NJ; Beltsville & Fairland, MD; Blacksburg & Springfield, VA; Lexington, KY; Mississippi State, MS; Ames, IA; St. Paul, Lincoln, NB; Stillwater, OK; Fort Collins, CO; Everett & Puyallup, WA; Hubbard, OR; San Jose & Riversi

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